LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

2017-2018 ANNUAL REPORT

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WILDLIFE & FISHERIES
2017-2018 ANNUAL REPORT

The charge of the Louisiana Department of Wildlife and Fisheries is to protect, conserve and replenish the natural resources, wildlife and aquatic life of the state.

Administration for fiscal year 2018-2019

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JACK MONTOUCET, SECRETARY

Robert E. Shadoin, Deputy Secretary
Bryan McClinton, Undersecretary
Patrick Banks, Assistant Secretary
Randy Myers, Assistant Secretary
Scott Longman, Deputy Assistant Secretary

DIVISION ADMINISTRATORS

Col. Sammy Martin, Enforcement
Harry Blanchet, Fisheries Management
Jason Froeba, Fisheries Research & Development
Kenneth Ribbeck, Wildlife
Buddy Baker, Coastal & Nongame Resources

Commission for fiscal year 2018-2019

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COVER PHOTO: *Setting winter sun on a Louisiana bayou by Daniel Ray Photography, Shutterstock.com*

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

2017-2018 ANNUAL REPORT

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

ORGANIZATIONAL OVERVIEW

OFFICE OF SECRETARY

The Office of Secretary is administered by LDWF's chief administrative officer, who oversees all scientific operations as organized by the Office of Wildlife and the Office of Fisheries. The Secretary also has ultimate authority over the operation of LDWF's fiscal and business matters as administered by the Office of Management and Finance. Support operations of LDWF report directly to the Secretary. These include the Enforcement Division, LDWF's Legal Section and Public Information.

ENFORCEMENT DIVISION

The Law Enforcement Division is responsible for enforcing laws enacted by the Louisiana Legislature, rules and regulations adopted by the Louisiana Wildlife and Fisheries Commission, and federal laws relative to fish and wildlife resources, boating safety, waterways enforcement activities, search and rescue, and homeland security missions.

PUBLIC INFORMATION

The Public information section is responsible for media relations, all print publications (regulation brochures, "The Louisiana Conservationist" magazine, annual report, etc), the agency website, social media, video production, photography, press conference organization, as well as speech writing and talking points as needed.

LEGAL SECTION

The Legal Section represents the department and the Wildlife and Fisheries Commission in all legal matters involving promulgation, enforcement and administration of the state's fish and game laws and regulations, litigation involving department programs, daily advising and counsel, and drafting of contracts, legal documents and legislation.

OFFICE OF MANAGEMENT & FINANCE

The Office of Management and Finance is directed by the Undersecretary. This unit is responsible for the following functions: human resources, accounting, budget forecasting and control, strategic and operational planning, property control and fleet management, boat registration, motor and boat titling, federal grant reporting, license and permit administration and issuing, fees, taxes and penalties collections.

LICENSING

The Licensing Section administers the issuance of all licenses, harvest tags and most other permits, boat and motor titles and registrations, and is responsible for the collection and deposit of related fees.

PROPERTY CONTROL

The Property Control Section is responsible for LDWF's movable property program, fleet management program, and managing property, marine, general liability, aviation and vehicle insurance claims.

FISCAL

The Fiscal Section is responsible for all financial operations of LDWF.

HUMAN RESOURCES

The Human Resources section handles all matters of employee relations, processes all employee personnel actions, processes all retirement/benefits related actions, develops related policies and procedures, coordinates all training activities for the agency, conducts new employee orientation, administers the performance planning and review program, handles all FMLA related matters and manages the safety program which includes worker's compensation processing.

OFFICE OF WILDLIFE

The Office of Wildlife consists of the Wildlife Division, Coastal & Non-game Resources Division, Education, Habitat Section and Minerals Management Section.

WILDLIFE DIVISION

The Wildlife Division is responsible for the state's wildlife conservation program and gathering biological data to properly manage wildlife resources.

COASTAL & NONGAME RESOURCES DIVISION

Conservation of coastal wildlife species and their marsh habitats, along with statewide responsibility for nongame and threatened and endangered species are the primary division responsibilities. This is addressed through major programs: Rockefeller Wildlife Refuge; White Lake Wetlands Conservation Area; Natural Heritage Program; Oil Spill Response; Natural Resource Damage Assessment; Alligator and Furbearer Programs; and Coastal Operations Program.

OFFICE OF WILDLIFE (cont.)

EDUCATION

The Hunter Education program provides mandatory hunter training to thousands of students annually and promotes hunting, fishing, archery, firearm safety and conservation. The Environmental Education and Litter Reduction Section provides information and resources to PK-12 and post-secondary educators and students and acts on behalf of the Environmental Education Commission.

MINERALS MANAGEMENT & HABITAT SECTIONS

Minerals Management is responsible for ensuring that oil and gas activities on all LDWF properties are carried out in a manner that is compatible with the environment and management area goals and objectives. By administering regulatory programs or by coordinating regulators, the Habitat Section seeks to conserve fish and wildlife resources, in particular wetlands.

OFFICE OF FISHERIES

The purpose of the Fisheries program is to manage aquatic resources and their habitat, to support the fishing industry, and to provide access, opportunity and understanding of the Louisiana aquatic resources to the state's citizens and others beneficiaries of these sustainable resources. The Office of Fisheries is comprised of two Divisions: Fisheries Management and Fisheries Research and Development. The Fisheries Management Division includes the Marine Fisheries and Inland Fisheries Sections and the Oyster Lease Program. The Fisheries Research and Development Division includes Fisheries Extension, Fisheries Habitat, Fisheries Research and Assessment, and Socioeconomic Research sections.

MARINE FISHERIES

The Marine Fisheries Section is responsible for the monitoring and management of the state's estuarine and nearshore marine fishery resources. This includes both fishery-dependent (recreational and commercial) and fishery-independent monitoring of fish and shellfish populations. Section personnel annually develop recommendations for seasons, harvest limits, and other management measures to ensure sustainable populations.

INLAND FISHERIES

The Inland Fisheries Section is responsible for the monitoring and management of the state's freshwater resources. This includes sportfish population monitoring and management, providing boating access through aquatic vegetation control, sportfish production and stocking through the hatchery system, and aquatic nuisance species monitoring and outreach.

OYSTER LEASE PROGRAM

The Oyster Lease Section is responsible for the administration of oyster lease agreements and alternative oyster culture permits, in addition to the collection of revenue generated by these processes. This is done through a Geographic Information System (GIS) that the section manages and maintains.

FISHERIES EXTENSION

Fisheries Extension provides guidance and assistance to Louisiana's valuable commercial and recreational fishing sectors through assistance, education and outreach. The artificial reef program enhances the state's abundant marine resources by developing additional habitat utilizing clean, durable and stable materials.

FISHERIES RESEARCH & ASSESSMENT

The Fisheries Research and Assessment Section is responsible for conducting research on the state's estuarine, marine and inland fishery resources. The section includes the Fisheries Development Group and the Fisheries Research Laboratory on Grand Isle, which, in addition to research, also conducts monitoring of offshore fishery stocks through cooperative sampling programs. The section also includes the Fisheries Stock Assessment Program, responsible for developing modern measures of the health of fish stocks statewide to ensure sustainable populations and estimate effects of regulatory changes, and the Fisheries Habitat/Permitting Group which interacts with all LDWF sections and divisions and state and federal entities in planning and implementation of restoration initiatives for fulfillment of resource recovery agreements from oil spill settlements, reviewing and commenting on regulatory and consistency permit applications, and efforts to conserve and restore fish and wildlife habitat.

A Word from the Secretary

The mission of the Louisiana Department of Wildlife and Fisheries isn't accomplished during regular business hours, 9 a.m. to 5 p.m., Monday through Friday. This department works 24/7 and 365 days a year, come rain, shine, hot, cold, hurricane or any hazardous situation.

Department employees faced many challenges in FY 2017-2018 and we, again, continued our outstanding service to the people of Louisiana in the ways they've come to expect.

A few perfect examples came in August and September 2017 during Hurricane Harvey and in January 2018 in northeast Louisiana as chronic wasting disease appeared in Mississippi near our northeast border.

To assist our neighbors in Texas, our enforcement agents, well versed in hurricane search and rescue, deployed to the southeast portion of the Lone Star state to assist after Harvey's devastating strike. LDWF Enforcement sent out 73 agents with 69 trucks and 69 vessels to the Houston, Beaumont, Orange, Port Arthur, Kirbyville and Deweyville.

They rescued 1,513 people in Texas from Aug. 26 to Sept. 2, 2017. In addition, LDWF enforcement agents rescued 28 Harvey victims in Louisiana, primarily in the southwest part of the state.

Not more than two weeks later, LDWF agents traveled east to lend assistance in the Pensacola, Fla., area from Sept. 10-15, in the aftermath of Hurricane Irma. Fifty-five agents, along with 53 trucks, 50 vessels and a mobile command center made the trip.

A few months later, our people stayed up many nights in northeast Louisiana as part of our Chronic Wasting Disease Response Plan after the discovery of a buck that tested positive in Issaquena County, Miss., on Jan. 25. Issaquena County borders northeast Louisiana and the deer was found only a few miles from the Louisiana border on the east side of the Mississippi River.

LDWF sampled 300 deer within the buffer zone, which is within 25 miles of the case in Issaquena County. This sample size provides a 95 percent confidence interval that sampling would detect CWD at a prevalence rate of 1 percent. To do the sampling, LDWF veterinarians, biologists and technicians had to work day and night.

Collection efforts began on March 12 and extended into May. All of the sampled deer showed no signs of the disease. In addition to the 300 samples collected from northeast Louisiana, 422 statewide samples were collected for a total of 722 CWD samples in 2017-2018 and 9,000 since 2002.

The disease, as of this writing, has not been detected in Louisiana.

Just let me say, every segment of LDWF continued to step up its work in 2017.

The Office of Management and Finance sold more than 3 million recreational hunting, fishing, trapping and nonconsumptive use licenses and permits to more than 800,000 customers, generating in excess of $23 million in revenue. They also maintained license records for more than 70,000 lifetime licensees.

Sixty-one thousand commercial licenses were sold, representing 11,000 commercial fishermen, 3,000 business entities, 900 charter businesses and various permits that generate in excess of $4 million in revenue. And, 204,000 boat registration/title transactions were registered that generated more than $4.4 million in revenue. The Office of Management and Finance also maintained boat data in excess of 1 million records, 319,000 of which are actively registered.

Search and rescue is only part of what our enforcement staff is involved in. Enforcement conducted 333,099 patrol hours in FY 2017-2018, including 258,006 on land and 76,093 on water. Agents made 826,583 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations. Agents issued 12,560 criminal citations and 7,120 warnings during this period.

Enforcement also finished construction on a new training and emergency response facility. The project supports the mission of agent training, continuing education, boating safety, waterway enforcement activities, and specialized enforcement training the agency provides to other state and local law enforcement.

In the Wildlife Division, mandatory tagging and reporting of deer entered the 10th year in 2017. The reporting system tallied 70,501 deer, an increase of 33 percent from the previous year. This is vital information for our biologists as they keep tabs on our state's white-tail deer herds and their habitat.

Louisiana continues to play an important role in the North American Waterfowl Management Plan (NAWMP). LDWF strives to maintain ongoing projects and other activities associated with the NAWMP. In FY 2017-2018, North American Wetland Conservation Act (NAWCA) construction projects at Pomme de Terre and Boeuf WMA were completed. These projects include replacing two large dilapidated water control structures and screw gates with large weirs and stop-log structures at Pomme de Terre and construction of a dependable water delivery system for impoundments at Boeuf WMA.

Additional NAWCA grants are being developed for Russell Sage and Sherburne WMAs. These projects will increase waterfowl habitat and better enable shallow water management for wintering waterfowl.

The recovery of the Louisiana black bear continues to go well. As the population continues to go up, we worked to educate our citizens on the black bear. Along with the Southeast Association of Fish and Wildlife Agencies Large Carnivore Working Group, we helped to produce a regional bear website to act as a source of public information to address all forms of bear conflict occurring in the southeast. This resource can be used by the public to minimize bear conflicts and assist communities wishing to engage in a community-based initiative.

The Louisiana non-migratory whooping crane population continued to grow in 2017 due to the second largest shipment of captive-reared juvenile cranes received since the reintroduction project began in 2011. In November 2017, 23 juveniles were received from the International Crane Foundation and the Freeport-McMoRan Audubon Species Survival Center in New Orleans. In addition, we received seven chicks from the U.S. Geological Survey Patuxent Wildlife Research Center and two from the Calgary Zoo to socialize into a cohesive cohort.

We're particularly proud that in late April and early May, five chicks hatched to four pairs, the most to hatch since Louisiana's whooping cranes began breeding in 2014.

Our LA Creel Program continues to be a success. It monitors recreational fisheries and inland creel surveys using dockside interviews of recreational anglers to determine catch and a telephone/e-mail survey to determine fishing effort.

During FY 2017-2018, fisheries biologists worked 1,579 LA Creel assignments and conducted approximately 11,736 interviews of recreational fishing trips along Louisiana's coast. This resulted in 31,516 anglers being surveyed and 93,565 fish being counted. During FY 2017-2018, 145,341 private angler effort phone call or e-mail attempts were conducted to estimate effort. Of those attempts, 45,993 resulted in completed surveys.

Approximately 860 charter captains were monitored with an estimated 188,981 charter angler trips taken during FY 2017-2018. During FY 2017-2018 using LA Creel data, it was estimated that 2,146,338 recreational angler trips were taken.

During 2017-2018, fisheries biologists conducted 1,584 interviews of 2,590 recreational bass and crappie anglers on Louisiana's freshwater lakes and rivers. Fishing trips averaged 4.6 hours in length and recreational anglers targeting bass caught an average of 2.9 fish per trip while crappie anglers averaged 6.9 fish per trip.

We continue to aggressively fight nuisance aquatic vegetation. In FY 2017- 2018, the Aquatic Plant Control Program completed 81 Vegetation Management Plans for Louisiana public waterbodies.

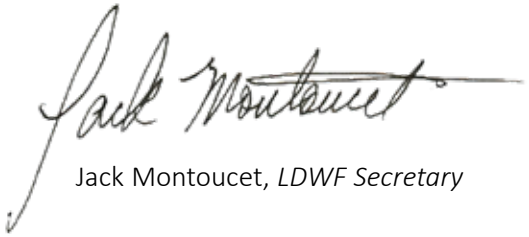
In FY 2017-2018, herbicides were applied to 52,735 acres of nuisance aquatic vegetation and the majority of these efforts included control of 15,988 acres of water hyacinth, 26,705 acres of giant salvinia, 2,551 acres of alligator weed and 1,641 acres of common salvinia. In addition, approximately 314,996 adult giant salvinia weevils were stocked in water bodies throughout Louisiana.

Our "Get Out & Fish!" community fishing program, initiated in November of 2014, continues to make strides. The goal of the program is to work with local community organizations and governments to provide easily accessible, high-quality fishing opportunities to everyone in Louisiana.

More than 1,100 anglers registered for the "Get Out and Fish!" events in FY 2017-2018.

We added three new community-fishing locations in FY 2017-2018, including Southside Regional Park-Fabacher Field in Youngsville, Elmore D. Mayfield Park in Ruston and Sidney Hutchinson Park in Walker. With the addition of these three sites, there are now 12 locations in the Community Fishing Program.

The aforementioned efforts and programs only scratch the surface of the work done at LDWF. To get a better picture, read our annual report for complete details in our department's natural resource management efforts.



Jack Montoucet, *LDWF Secretary*

Office of Secretary

ENFORCEMENT DIVISION

The Louisiana Department of Wildlife and Fisheries Law Enforcement Division (LDWF-LED) is responsible for enforcing laws enacted by the Louisiana Legislature and federal laws relative to fish and wildlife resources, boating safety, waterways enforcement activities, search and rescue, and homeland security missions.

LDWF-LED is a fully-commissioned statewide law enforcement agency with the primary mission of protecting Louisiana's natural resources and serving the people who utilize them. Beyond the traditional role of ensuring compliance with licensing and harvesting regulations, LDWF-LED also conducts search and rescue missions, enforces boating safety laws, investigates boating crash incidents and hunting accidents, and provides boater education classes for thousands of citizens each year.

The Law Enforcement Division is responsible for enforcing laws as provided for in the:

- Constitution of the State of Louisiana
- Louisiana Revised Statutes
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA)/LDWF Law Enforcement - Cooperative Enforcement Agreement - Law Enforcement Services under:
  - Magnuson-Stevens Fishery Conservation and Management Act
  - Endangered Species Act of 1973
  - Marine Mammal Protection Act of 1972
  - Lacey Act
- U.S. Department of Interior, U.S. Fish and Wildlife Service (USFWS)/LDWF Law Enforcement - Memorandum of Agreement - Law Enforcement:
  - Migratory Bird Treaty Act
  - Lacey Act; Migratory Bird Hunting and Conservation Stamp Act
  - Bald and Golden Eagle Protection Act
  - Airborne Hunting Act
  - National Wildlife Refuge System Administrative Act
  - Endangered Species Act
  - Marine Mammal Protection Act
  - Archeological Resources Protection Act
  - African Elephant Conservation Act
  - Antarctic Conservation Act
  - Wild Bird Conservation Act and Recreation Act
- U.S. Coast Guard/LDWF Law Enforcement - Statement of Understanding - Boating Safety Regulations:
  - BWI
  - Public Education and Training
  - Boating Accident Investigations
  - Search and Rescue
  - Regattas and Marine Parades
- Louisiana Department of Health and Hospitals/LDWF Law Enforcement
  - Memorandum of Understanding - Louisiana Shellfish Sanitation Program
  - National Shellfish Sanitation Program

LDWF-LED conducted 333,099 patrol hours in FY 2017-2018: 258,006 on land and 76,093 on water. Agents made 826,583 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations. LDWF-LED agents issued 12,560 criminal citations and 7,120 warnings during this period. The most common types of citations were fishing without a license, failure to comply with personal flotation device requirements, not abiding by rules and regulations on wildlife management areas (WMAs), and failure to comply with deer tagging or harvest record regulations.

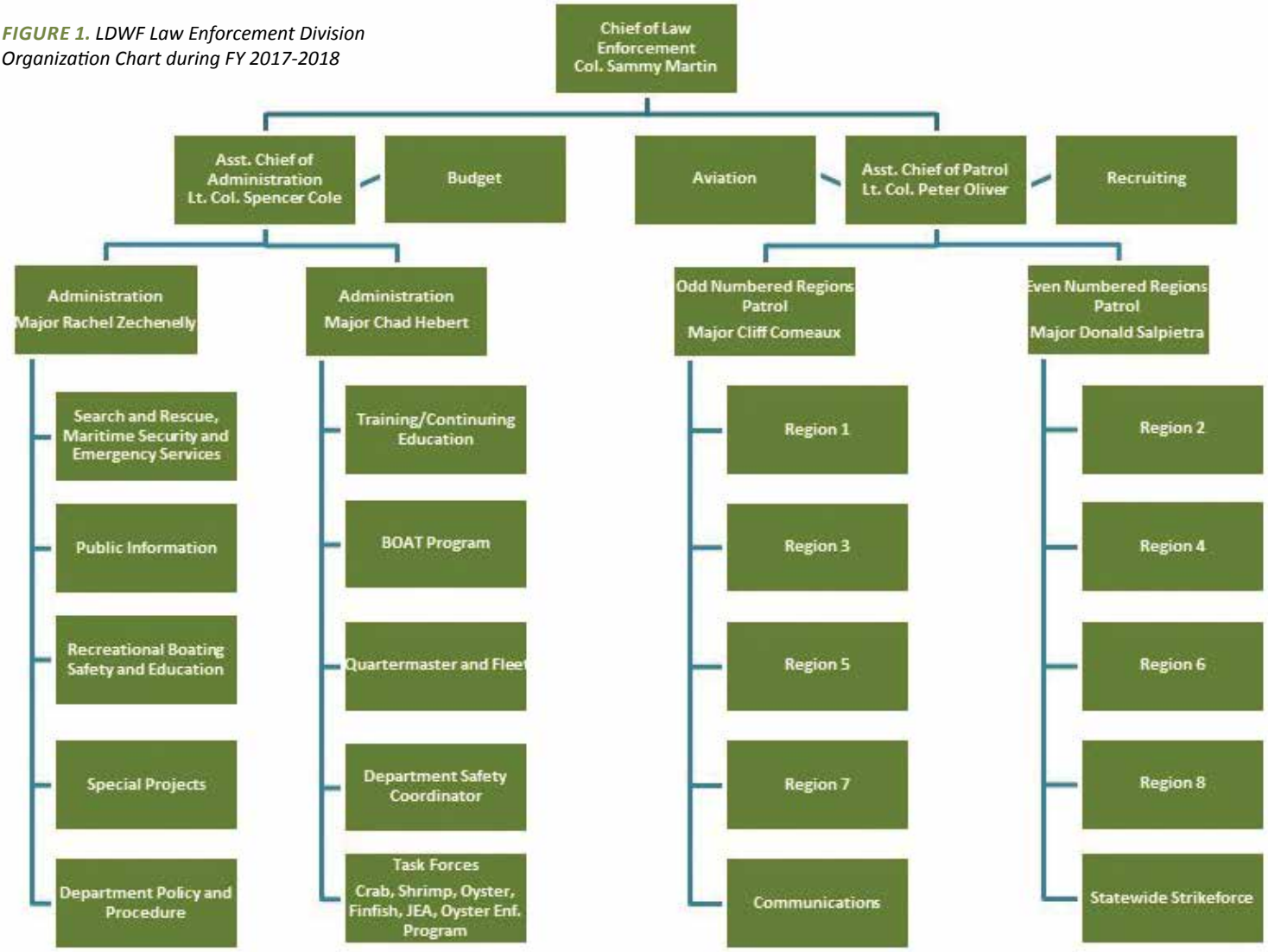
ORGANIZATIONAL STRUCTURE & PERSONNEL

LDWF-LED is organized in a paramilitary structure to assure the efficient use of resources, consistent statewide enforcement policy, and an effective, coordinated response to urgent needs (*Figure 1*). LDWF-LED is commanded by one colonel, the Chief of Enforcement, who reports directly to LDWF's Secretary and oversees administration of the division. Reporting to the colonel are two Lieutenant Colonels. One Lieutenant Colonel serves as assistant chief of administration which includes recreational boating safety and education, emergency services, training, support, public information and budget. The other Lieutenant Colonel serves as the assistant chief of patrol and supervises all state regional field operations, statewide communications, aviation and recruiting. There are four majors:

- one over the even-numbered enforcement regions of the state and statewide strike force
- one over the odd-numbered regions and the statewide communications sections
- one over training, support (quartermaster and fleet), JEA, safety and serves as the LDWF Enforcement representative for the shrimp, oyster, crab and finfish task forces
- one over the recreational boating safety and education programs, emergency services, special projects, policy and procedure, and serve as the state's boating law administrator

Col. Sammy Martin, head of the LDWF Enforcement Division

FIGURE 1. LDWF Law Enforcement Division Organization Chart during FY 2017-2018



The LDWF-LWD headquarters staff works out of Baton Rouge, headed by Col. Sammy Martin who was promoted to the head position in September 2017. Col. Martin, a native of Terrebonne Parish, graduated from the Louisiana POST Training Academy in 1982, receiving his POST certification from Louisiana State Police, and has been an agent for over 35 years.

The Enforcement Division is divided into eight enforcement regions and the statewide strikeforce. Each numbered enforcement region is composed of two or three multi-parish districts. Each region is managed by a captain who supervises two or three district supervisors of the lieutenant rank. Regions have between 16-25 agents, depending on regional size, resident population and participant population. Current funding provides a field enforcement staff of two to four agents per parish, according to the nature of wildlife-based activities in the area, the number of people participating, the frequency of their participation and other factors.

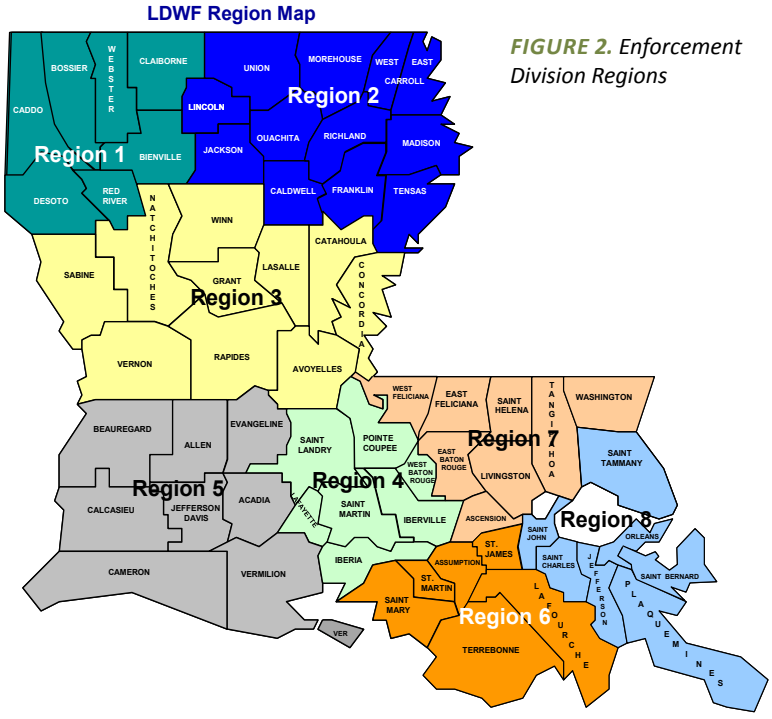


FIGURE 2. Enforcement Division Regions

Total division head count is 257 positions including 234 enforcement agents, 15 administrative staff, six communications officers and two pilots. The actual number of filled positions (as of July 2018) is 237.

REGIONAL ENFORCEMENT PROGRAMS

Most of the law enforcement activity performed by LDWF-LED is conducted by regional agents. Regional agents work a schedule assigned by their supervisors to address seasonal needs, reported violations, weather conditions and predominant activities. Agents are on-call 24 hours per day and must be willing to change their work hours and locations as circumstances require. Schedules are often changed due to weather and reported violations, and agents are often called out to respond to violations in progress, boating and hunting accidents, and calls for search and rescue.

Agents use a variety of vehicles during land patrols, primarily four-wheel drive trucks and all-terrain vehicles. The primary patrol vessels used during water patrols are outboard bay boats and 19-to-40-foot marine patrol vessels. LDWF-LED also deploys go-devils, airboats, surface river mudboats, bass boats and flatboats.

SPECIALIZED UNITS

The LDWF Enforcement Division contains three specialized units with selected missions or purposes: the Statewide Strike Force; the Maritime Special Response Team; and the Aviation Section. Agents in specialized units have developed specific skills, expertise and knowledge appropriate for their particular operational fields. Agents in specialized units operate in relatively broad geographic areas and may work alongside regional enforcement agents when appropriate.

STATEWIDE STRIKE FORCE

The Statewide Strike Force is assigned to work problem areas statewide. They devote attention to commercial fisheries operations, license fraud and white collar crimes. Violations include smuggling, interstate commerce violations and false reporting and under-reporting of commercial fish harvests. These agents provide regional patrol with additional manpower on WMAs and places of high seasonal utilization, such as Grand Isle and other locations throughout the state. Strike Force agents also assist regional agents with oyster harvest enforcement, which primarily addresses harvesting oysters in closed waters, stealing from oyster leases and state grounds, and oyster size regulations.

MARITIME SPECIAL RESPONSE TEAM

The Maritime Special Response Team cooperative endeavor by LDWF-LED and the Louisiana State Police SWAT team addresses maritime security threats within the state of Louisiana. The team provides a maritime tactical response capability at the state level in order to effectively provide public safety, officer safety, Chemical, Biological, Radiological, Nuclear and High-yield Explosives (CBRNE) prevention, and response and tactical support for LDWF's federal, state and local partners.

AVIATION SECTION

The Aviation Section contains two pilots and four total planes which include one Kodiak, one Cessna 210 and two Cessna 206 amphibians. The Aviation Section's aircraft provide a valuable platform for detecting illegal hunting and fishing activities and frequently play a vital life-saving role in search and rescue operations. The Aviation Section also contributes its services to other divisions for biological missions, such as waterfowl counts and the monitoring of commercial fisheries.

BOATING SAFETY PROGRAM

With 15,000 miles of tidal coastline, 5,000 miles of navigable waterways, three of the busiest ports in the country, a thriving shipping industry, a large commercial fishing fleet, and over 327,000 registered boats, Louisiana contains many geographic, demographic and economic features that pose special challenges for boating safety enforcement. LDWF-LED agents made 236,759 public contacts during the course of 60,425 patrol hours dedicated to boating enforcement, education and accident investigation in FY 2017-2018. Of those hours, 44,912 patrol hours were performed in vessels on the water.

The adoption of "Rules of the Road" regulations for boaters has enhanced the enforcement of boating safety regulations and boating under the influence laws. These regulations provide the boating public with clear rules for the manner in which boats are operated and are an important tool in determining fault in boating accidents. The "Rules of the Road" also enhance the ability of agents to address reckless and careless operation of motorboats. In FY 2017-2018, LDWF-LED agents issued 54 citations for careless and reckless operation of a vessel and 68 citations for operating a vessel while intoxicated.

The statewide LDWF-LED boater education course teaches safe, legal and responsible boat operation and is approved by the National Association of State Boating Law Administrators (NASBLA). This program pro-

An agent looks on during a safe boating patrol.

vides a vital outreach to the community and has greatly improved the awareness of and compliance with boating safety practices and regulations in Louisiana. Agents hold monthly classes in each region for anyone who wishes or is required by Louisiana law to take them. In FY 2017-2018, 8,389 citizens were certified in classroom and online classes. LDWF-LED continues to recruit and train additional volunteer instructors to complement and enhance the efforts of its own agents. Since the inception of the boating safety education course in 2003, LDWF has certified 112,700 students.

LDWF-LED remained committed in marketing and promotion of boating education courses by creating special events and activities for students attending courses.

LDWF certified 78 students during the NASBLA "Spring Aboard" national marketing campaign from March 18-24 to promote opportunities for boaters to enroll in a boating education course.

LDWF also certified 150 boaters statewide after their eighth "Boating Education Lagniappe Day" on April 21. Lagniappe Day ran from 9 a.m. to 5 p.m. at eight locations across the state and consisted of the NASBLA boating education course, food and drinks, giveaways and door prizes all free of charge to the public.

LDWF participated in several national campaigns including "Wear Your PFD to Work Day" on May 18, "Ready Set Wear It" on May 19 and the "Safe Boating Week" in Louisiana from May 19-25. LDWF-LED agents were out in full force as always during the safe boating week to perform boating safety checks and driving or operating a vessel while intoxicated (DWI) patrols.

LDWF once again participated in NASBLA's Operation Dry Water from June 29 - July 1, 2018. During Operation Dry Water, agents stepped up patrols looking for operators of vessels who were impaired or under the influence of alcohol or drugs. During the weekend, agents made 10 boating under the influence case and issued 103 safe boating citations with 79 safe boating warnings.

Media interviews, news release articles, public relation events and social media comments occurred throughout the state during all listed campaigns.

SEARCH & RESCUE OPERATIONS

LDWF-LED is responsible for providing and coordinating search and rescue response and maritime security activities for the state. This activity supports the state's goal of hurricane recovery and emergency preparedness by planning, training and coordinating local, state and federal response for search and rescue associated with natural or manmade disasters. Preparedness and efficient execution of search and rescue response events is essential to saving lives and swift recovery efforts. Providing maritime security on our state's waterways is essential to protection of critical infrastructure located in maritime environments throughout Louisiana.

LDWF-LED rescued a total of 1,541 people and 195 pets in both Texas and Louisiana following the aftermath of Hurricane Harvey. The total number of people rescued included 1,513 in Texas and 28 people in Louisiana. LDWF-LED deployed a total of 73 agents with 69 trucks and 69 vessels to the Houston, Beaumont, Orange, Port Arthur, Kirbyville and Deweyville areas from Aug. 26 - Sept. 2, 2017.

LDWF sent 55 agents with 53 trucks, 50 vessels and a mobile command center to the Pensacola area in Florida from Sept. 10-15, 2017 following the aftermath of Hurricane Irma.

AGENT TRAINING PROGRAM

LDWF-LED finished construction on a new training academy and emergency response facility. This project supports the mission of LDWF-LED agent training, continuing education, boating safety and waterway enforcement activities, and specialized enforcement training the agency provides to other state and local law enforcement. It also supports the state's lead emergency support function agency for search and rescue response and maritime security. In addition, this project further develops existing training infrastructure to maximize benefits for LDWF-LED, aids in the support of the training needs of local, parish and marine enforcement agencies, and provides a facility to meet the needs for providing boating safety course instruction.

IN SERVICE TRAINING PROGRAM

The LDWF-LED in-service training program is conducted in three phases and consists of "annual in-service," "spring firearms" and "fall firearms." The in-service training is necessary in order to meet federal and state training requirements and to advance individual officer capability.

Annual in-service is usually around 40 hours and consists of 10 training sessions conducted over a 10-month period. During these sessions, agents receive training in firearms, defensive tactics/use of force, officer survival, legal, first aid and electives. Spring and fall firearms training sessions focus on firearms qualification and training.

At the end of 2017, agents completed their annual and fall/spring firearms in-service training requirements, which consisted of the following:

SPRING/FALL: IN-SERVICE

- Firearms

ANNUAL: IN-SERVICE

- First Aid/Blood Borne Pathogens/CPR for the Professional Rescuer
- Defensive Tactics/Use of Force
- Firearms
- DWI (Intox. 9000, Standardized Field Sobriety Testing (SFST), Boating Under the Influence (BUI) Seated Test Battery, LA Drive, Blood Kits and Warrants)
- Taser
- Officer Survival/Care under fire (scenario based force on force training)
- Maps and Navigation
- ARIDE Retrainer (Advanced Roadside Impaired Driving Enforcement)
- ATF (Illegal firearms/silencers)

FIREARMS

LDWF-LED added two agents to its cadre of firearms instructors. These agents completed the selection, qualification and training process to become a certified LDWF and Peace Officer Standards and Training (POST) firearms instructor. They will be able to provide the other instructors with assistance in providing the required firearms training to all agents and cadets throughout the enforcement division.

DWI

Four agents were certified as Drug Recognition Experts, bringing the LDWF-LED total to 17 Drug Recognition Experts.

MARINE LAW ENFORCEMENT TRAINING PROGRAM

At the end of 2017, all agents had completed their annual recertification as Boat Operators for Search and Rescue in the NASBLA Boat Operations and Training Program (BOAT).

LDWF/LED successfully completed the NASBLA BOAT Program, three-year audit and re-accreditation.

The BOAT Program establishes a U.S. Coast Guard recognized national standard for the training, qualification, credentialing and typing of marine law enforcement and emergency first responders.

Accreditation of an agency ensures that its training curricula, policies, qualification processes and documentation for crew members, boat operators for search and rescue, and tactical operators meets the BOAT Program's national standards, and allows an agency to train and qualify all of its officers internally, as well as its partners on the water.

In 2011, LDWF/LED became the first agency in the country to receive accreditation in the NASBLA BOAT Program.

CRISIS INTERVENTION OR CRITICAL INCIDENT TRAINING

LDWF has four agents trained in Crisis Intervention and Critical Incident as part of the Agents Crisis Team. The Agents Crisis Team consists of agents who are specially trained as skilled listeners. The objective of the Agents Crisis Team is to provide support for law enforcement personnel, and their immediate family, who have experienced a critical incident or traumatic event. A critical incident is defined as any incident, action or event, which has the potential for producing significant emotional trauma that may adversely affect the psychological well-being of law enforcement personnel.

ACADEMY

LDWF-LED conducted the hiring process to fill 24 enforcement agent positions. The LDWF Training Academy Class 32 began their six months of training on July 2, 2018.

JOINT ENFORCEMENT AGREEMENT

LDWF-LED again entered into a Joint Enforcement Agreement with the NOAA Office for Enforcement. LDWF-LED received approximately $910,867 in FY 2017-2018 to patrol for compliance with federal commercial and recreational fisheries regulations, primarily in the Gulf of Mexico.

OPERATION GAME THIEF

Louisiana Operation Game Thief, Inc. is a program which provides cash rewards to those providing information leading to the apprehension of wildlife violators. Violations can be reported anonymously by calling a 24-hour toll-free telephone number (1-800-442-2511) or by using LDWF's tip411 program. To use the tip411 program, citizens can text LADWF and their tip to 847411 or download the "LADWF Tips" iPhone or Android apps from the Apple App Store and Google Play free of charge. The hotline and the tip411 program are monitored 24 hours a day by the LDWF Communications Center. Reports are immediately referred to agents for action.

During the 2017 year, Operation Game Thief paid out $11,200 in rewards. In 2017 the Louisiana Operation Game Thief board reviewed 28 cases that led to 63 subjects getting cited or arrested and a total of 287 citations issued. From 1984 till the end of 2017 the Louisiana Operation Game Thief board has paid out a total of $402,100 in reward money to informants.

HOMELAND SECURITY

LDWF-LED is an active participant in Louisiana's Homeland Security Plan and represents the state in waterborne emergencies. Through the Governor's Office of Homeland Security and Emergency Preparedness, LDWF-LED is the lead agency for search and rescue operations during natural disasters and maritime security of Louisiana's vital business and government interests along the coast and major rivers. As members of the Governor's Homeland Security Advisory Council and all major port security committees within the state, LDWF-LED agents frequently respond to requests to deploy LDWF marine resources for security concerns. LDWF-LED's specialized training and equipment and its ability to operate throughout the state's vast maze of waterways and wild areas has complemented Louisiana's ability to respond to emergencies on land and water.

Emergency Support Function annual support plan for maritime and port security has been updated. LDWF-LED serves as the primary port and maritime security support partner.

LDWF-LED is a member of the First Responder Committee through the Governor's Office of Homeland Security and Emergency Preparedness which was legislatively created. LDWF-LED's maritime security role coincides as a multi-mission responsibility and further enhances the agency's core mission responsibilities to improve public safety services and protect natural resources and the supporting ecosystem while improving security in the state and nation.

MARITIME SPECIAL RESPONSE TEAM

The LDWF-LED Maritime Special Response Team partners with the Louisiana State Police SWAT team to address maritime security threats within the state of Louisiana. The team provides a maritime tactical response capability at the state level in order to effectively provide public safety, officer safety, and tactical support for LDWF-LEDs federal, state and local partners.

During this period the LDWF-LED Maritime Special Response Team completed their annual training which consisted of:

- Close Quarter Battle Techniques
- Firearms Training
- Security Zone Enforcement Procedures
- Underway Training
- Hostage scenarios
- Large Vessel Training
- Rural Operations and Tactical Tracking
- Water Survival

At the end of 2017, Maritime Special Response Team members had completed their annual recertification as Tactical Operators Course in the NASBLA BOAT Program. Ten agents were recently selected to fill vacancies on the Maritime Special Response Team. After an

Senior Agent Tyler Wheeler returned to full time duty in July 2017.

intense and thorough selection process, these agents completed the two week Louisiana State Police SWAT school and are scheduled to complete the NASBLA Tactical Operators Course during the next fiscal year.

PREVENTATIVE RADIOLOGICAL AND NUCLEAR DETECTION (PRND)

LDWF continues to work with key local, state and federal partners to implement a PRND program in the state of Louisiana. Through our partnership with the Domestic Nuclear Detection Office, the state has developed a statewide concept of operations plan, as well as standard operating procedures for individual agency partners. LDWF and PRND partners successfully completed a three-day training exercise as well as a full scale exercise.

ACQUISITIONS

EQUIPMENT:

- 13 search and rescue vessels
- 17 replacement outboard motors
- 43 (4x4) patrol trucks
- 2 administration SUVs
- 7 ATVs
- 50 replacement iPads
- 7 replacement/new personal ballistic vests
- 235 external vest carriers

PUBLIC INFORMATION

The LDWF-LED Public Information section does various media and public information related tasks. The public information section handles public emails, Facebook questions, media requests including setting up interviews, and gathering enforcement related information. The Public Information section also provides footage and photos to media outlets both in-state and nationally.

LDWF-LED issued 120 enforcement related press releases during FY 2017-2018. These press releases were issued to a media contact list via email both state and nationwide. They were also posted on the LDWF website. The press releases ranged from rewards for information on current cases, conviction results, announcements of event and upcoming cadet academies, highlighting important and unusual cases, enforcement division and agent achievements and awards won, and boating safety Information.

LDWF-LED Public Information also produces videos for both external and internal use. The videos range from public service announcements, cadet recruitment, hunting and boating safety and cadet training.

AGENT-SPECIFIC UPDATES

SENIOR AGENT TYLER WHEELER RETURNS TO DUTY

Senior Agent Tyler Wheeler, 25, was shot four times including once in the head and once in the back while questioning a motorist around 2 a.m. on Jan. 7, 2017 on Hwy. 165 between Sterlington and Bastrop in Morehouse Parish. After numerous surgeries and countless hours of physical therapy, Wheeler was cleared to return to full time duty in late July 2017.

Wheeler's first day back in uniform was Aug. 4, 2017 and he went through a week of in-service training before beginning his first week of patrol duties on Aug. 14, 2017.

Louisiana State Police Detectives arrested Amethyst Baird Rathore of Monroe on one count of attempted first-degree murder of a police officer and Jeremy Gullette of Monroe, on one count of accessory after the fact to attempted first-degree murder on Jan. 8, 2018.

Rathore was sentenced on March 2, 2018 by Judge Carl V. Sharp of the 4th Judicial District Court to 60 years in prison without the possibility for parole for attempted first degree

murder of a police officer for shooting LDWF Senior Agent Tyler Wheeler. Rathore also received 40 years for obstruction of justice, 10 years for illegal possession of a stolen vehicle and 10 years for illegal possession of a stolen firearm, all of which will run concurrently.

FLAGPOLE DEDICATED TO FALLEN CADET

LDWF-LED dedicated a flagpole in memoriam of a former LDWF cadet at the Louisiana Wildlife and Fisheries Training Academy on May 30 in Baton Rouge.

The flagpole is being dedicated in memory of Byron Dore who was a part of the 23rd LDWF Academy Class when he passed away at the age of 24 in 2008. The Dore Family, the McIlhenny Company and the Louisiana Wildlife Agents Association donated the money to erect the flagpole.

Dore was about halfway through his LDWF training to become an agent when he drowned in Iberia Parish on his weekend off from training.

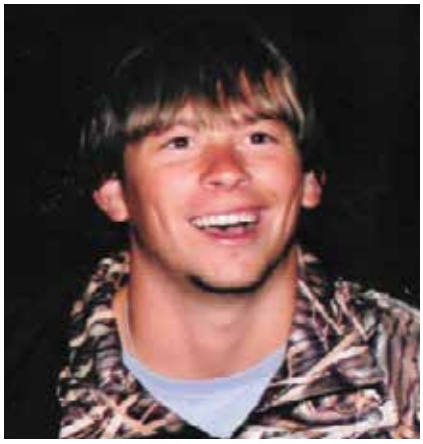
The Byron Dore Memorial Flag Pole is planted in front of the new Louisiana Wildlife and Fisheries Law Enforcement Training and Emergency Response Complex at the Waddill Outdoor Education Center off North Flannery Road in Baton Rouge.

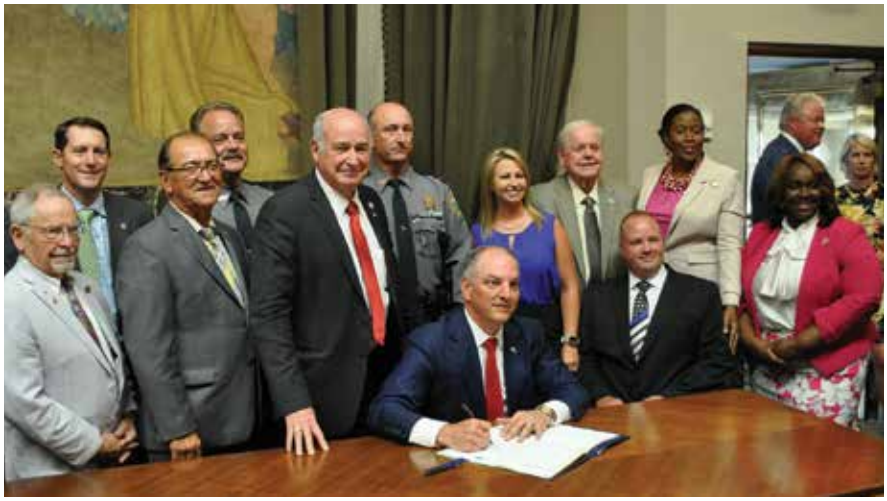
SHOT AGENT RECEIVES FULL RETIREMENT BENEFITS

Gov. John Bel Edwards signed a bill into law on May 31, 2018 in Baton Rouge that will provide full retirement benefits to former LDWF agent Scott Bullitt who was shot in the line of duty.

House Representative Terry Brown of District 22 authored House Bill 37 that will provide full Louisiana State Employees' Retirement System benefits to hazardous duty members that are totally and permanently disabled in the line of duty by an intentional act of violence. LDWF's own Scott Bullitt will qualify for the full Louisiana State Employees' Retirement System retirement benefits because of this bill.

Bullitt, originally from Grant Parish, had been an agent for over five years when he was shot in the line of duty on May 21, 2015 in Ouachita Parish. Bullitt has been confined to a wheelchair since the shooting and was unable to return to regular LDWF agent duties. Bullitt's shooter, Luke Hust, was sentenced to life in prison on Jan. 27, 2016 in Ouachita Parish.





LEFT: *The LDWF Enforcement Division dedicated a flagpole at the LDWF Cadet Academy to a fallen cadet Byron Dore (pictured left).*
BELOW: *Governor John Bel Edwards signed House Bill 37 into law that provides full retirement benefits to former LDWF agent Scott Bullitt, who was shot in the line of duty and unable to return as an agent.*

PUBLIC INFORMATION

The Public Information Office handles the communication programs for the LDWF. These programs cover a variety of communication outlets including publications and brochures, media relations, press releases, social media, audio-video productions, photography, and website development.

SOCIAL MEDIA

The department continues to strengthen constituent engagement by leveraging and enhancing its social media platforms and execution. Our constituents are taking a more active role in social media conversations and storytelling today, making our social media outlets one of the key methods of distributing department information. As our Facebook page audience continues to grow, the agency has shifted some of its social media focus to Instagram, to begin building a stronger audience base on this platform. Instagram is a great tool to showcase behind-the-scenes work at the agency that our constituents don't typically get to see. Facebook remains our strongest social channel, and thousands of questions are submitted annually through the messaging function, providing constituents another means of communicating with the department.

- Facebook Followers: 73,732
- Instagram Followers: 2,491
- YouTube Subscribers: 638
- Twitter Followers: 2,295

PUBLICATIONS

The Public Information staff is responsible for the production of specialized publications, all regulation pamphlets and the annual report. All pre-press functions, including graphic design and final printing approvals are handled by staff in this section.

Specialized publications include any publication not produced on a regular basis. These publications are used for educational, informational and promotional use for conservation management programs and special events.

LOUISIANA CONSERVATIONIST MAGAZINE

Louisiana's longest running outdoor magazine returned to print in the fall of 2016. The "Louisiana Conservationist" had been the long-standing outdoor publication for Louisiana's wildlife and fisheries enthusiasts.

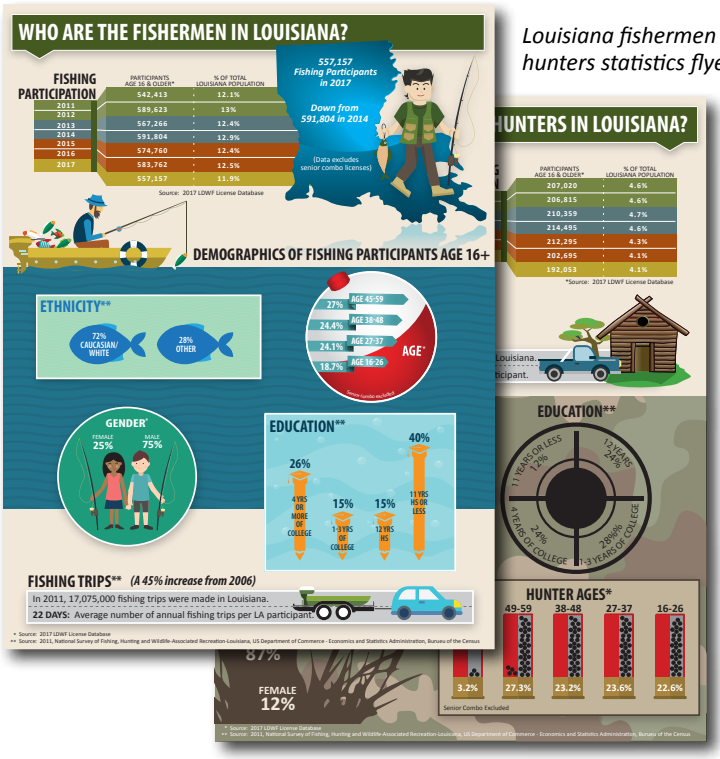
The "Louisiana Conservationist" is a 90-year-old publication that began in 1917 when Lucy Powell Russell became the first female to serve as Secretary of the state's wildlife agency.

The long-term goal of the magazine is to serve as an educational outlet for anyone yearning to know more about Louisiana's outdoors, especially students. The print publication is a product of existing department staff, and available free of charge on a quarterly basis from LDWF field offices across the state. The current issue, and archived issues back to the magazine's inception in 1927 are available at *LAConservationist.wlf.la.gov*.

LDWF headquarters native plant garden sign.

LDWF traveling library display.

LEFT TO RIGHT: *Chronic wasting disease flyer, Wildlife Rehabilitation Program flyer and Get Out& Fish! flyer.*



Louisiana fishermen and hunters statistics flyers.

PHOTOGRAPHY AND AUDIO-VIDEO PRODUCTIONS

The Public Information Office is responsible for the production of specialized audio and video projects, video news releases, media footage requests, and audio recordings of various meetings. The audio and video library consists of more than 2,000 tapes of raw footage available for media and education purposes. Public Information staff is also responsible for department photography needs. Experienced photographers are on staff to help document the numerous department programs featured in LDWF news releases, brochures, posters and the "Louisiana Conservationist" magazine.

The Audio and Video Production staff assisted the department in promoting several programs throughout the year by producing educational videos and video news releases for media distribution and for viewing by the public on LDWF's website and across LDWF social media platforms. Public Information staff handle all video pre- and post-production in-house.

Public Information staff has implemented a digital storage and file sharing system for our large library of videos and photos. This searchable system archives tens of thousands of files, many of which are rare historic images from LDWF's past. Many of our videos are also shared publically on our YouTube channel at *www.youtube.com/user/LAWildlifeFish*.

WEBSITE

The LDWF website, *wlf.louisiana.gov*, again had an increase in visitors this year with 2,410,252 visits. The breakdown of new and returning viewers was comprised of 45.81 percent, and 34.26 percent respectively. Site visitors executed more than 9 million page views and spent an average of 1:19 minutes on the site.

LEFT: *LDWF recruitment booklet.*
ABOVE: *WMA Z-cards*

2017-2018 PUBLIC INFORMATION PROJECTS

PROJECTS FOR OFFICE OF SECRETARY
Overall Projects
News Releases (144 total: 124 for Enforcement and 20 for Secretary)
Logo/Branding Updates
Traveling Library Display
Employee Appreciation Week Activities (print and email materials, hosting events, etc.)
Price of Paradise Campaign (print materials, website/social media pieces, video and PowerPoint)
R3 Strategic Planning
National Hunting & Fishing Day Marketing Materials (4 locations)
Website Design (concept, style guide, banners, buttons, etc.)
LDWF Digital Library
Facebook Banners
Brochures/Handouts
Enforcement Forms and Materials
Louisiana Conservationist
2017 Summer Louisiana Conservationist
2017 Fall Louisiana Conservationist
2017 Winter Louisiana Conservationist
2018 Spring Louisiana Conservationist
Annual Publications
2016-2017 Annual Report
Videos
Louisiana's Historic Flood, One Year Later
The Price of Paradise: Funding Louisiana's Fish, Wildlife, and Habitat for our Next Generation
Miscellaneous
State Capitol Christmas Tree

PROJECTS FOR OFFICE OF MANAGEMENT & FINANCE
Overall Projects
News Releases (4 total)
Brochures/Handouts
LDWF Recruiting Brochures/Flyers
Licensing App Design Pieces

PROJECTS FOR OFFICE OF WILDLIFE
Overall Projects
News Releases (142 total)
Wildlife Rehabilitation Marketing and Print Material
Roseau Cane Marketing and Print Material
Becoming an Outdoor Woman Marketing and Print Material
Archery in Louisiana Schools (ALAS) Marketing and Print Material
Whooping Crane Reintroduction Campaign
Hunting Regulations Distribution
Posters/Signs
Garden Signs for Front of HQ Building
Wildlife Management Area Signs (updated acreage and logo)
Common Species of Louisiana Posters (5)
Chronic Wasting Disease Regulations Poster
Annual Publications/Newsletters
2017-2018 Hunting Regulations
2017-2018 Trapping Regulations
2017 Fall/Winter Wildlife Insider Newsletter
2018 Spring/Summer Wildlife Insider Newsletter
2018 Spring Bluestem Newsletter
2018 April Friends of the Whooping Cranes Newsletter

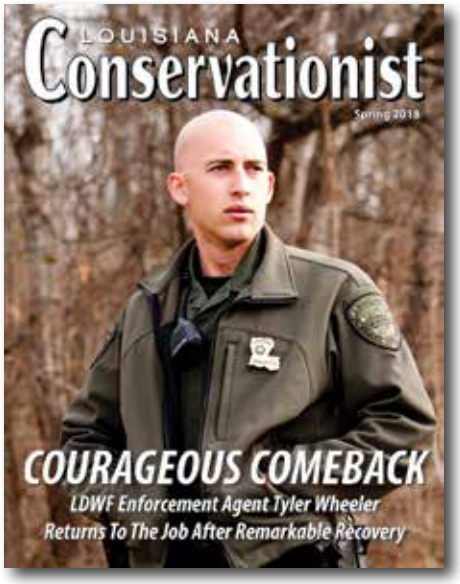
PROJECTS FOR OFFICE OF WILDLIFE (cont.)
Brochures/Handouts
Hunter Education Forms
Understanding Black Bears Website Flyer
2018 Research & Management Symposium Abstracts Booklet
Ducks at a Distance Booklet (recreated)
2017 Deer Management Assistance Program (DMAP) Brochure
Hunter Education Flyer
2017 Youth Hunter of the Year Contest Flyer
Black Bear Contacts Handout
Chronic Wasting Disease FAQ Flyer
Chronic Wasting Disease General Information Flyer
Videos
Deer Caping for Transport
Sonny Gilbert WMA Waterfalls
2017 Louisiana Waterfowl Conservation Stamp Contest
Whooping Crane PSA - English and French versions (revision)
Miscellaneous
Wildlife Management Area Z-cards (6 WMAs)
Trapping Animal Trading Cards (15 species/habitat)
Trapping Display Banner
Trapping Workshops Facebook Ads

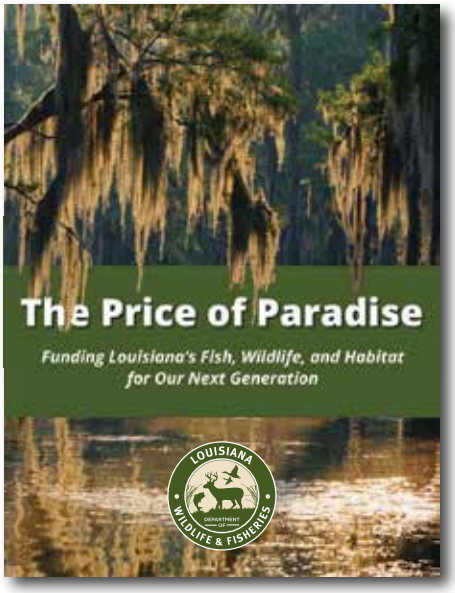
PROJECTS FOR OFFICE OF FISHERIES
Overall Projects
News Releases (171 total)
Big Bass Rodeo Marketing and Print Materials
Battle for the Bass Marketing and Print Materials
Get Out & Fish! Community Fishing Pond Marketing and Print Materials
Red Snapper Marketing and Print Materials
Sportfish Restoration Marketing and Print Materials
LA Creel Marketing and Print Materials
Fisheries Outreach Marketing and Print Materials
Fishing Regulations Distribution
Posters/Signs
False River Posters
Largemouth Bass Life Cycle Poster
ROLP Posters
Giant Salvinia Management Posters
Gulf Council Posters
St. Tammany Pier Signs
Get Out & Fish! Community Fishing Pond Signs
Common Species of Louisiana Posters (3)
Brochures/Handouts
Rio Grande Cichlid
Toledo Bend Map Brochure
Blue Crabbing Guide
Catfish Dichotomous Key
City Park Brochure
Derelict Crab Trap Rodeo Flyer
Fish Handling Placards
Goliath Grouper Flyer
Alternative Oyster Culture Handouts
Fish Kill Brochure
Annual Publications
2018 Recreational Fishing Regulations
Videos
2018 City Park Big Bass Rodeo
Fish Cleaning Instructional Video
Miscellaneous
Let's Go Fishing Workbook

ABOVE LEFT: *LDWF Digital Library.*
ABOVE RIGHT: *Updated LDWF website design.*

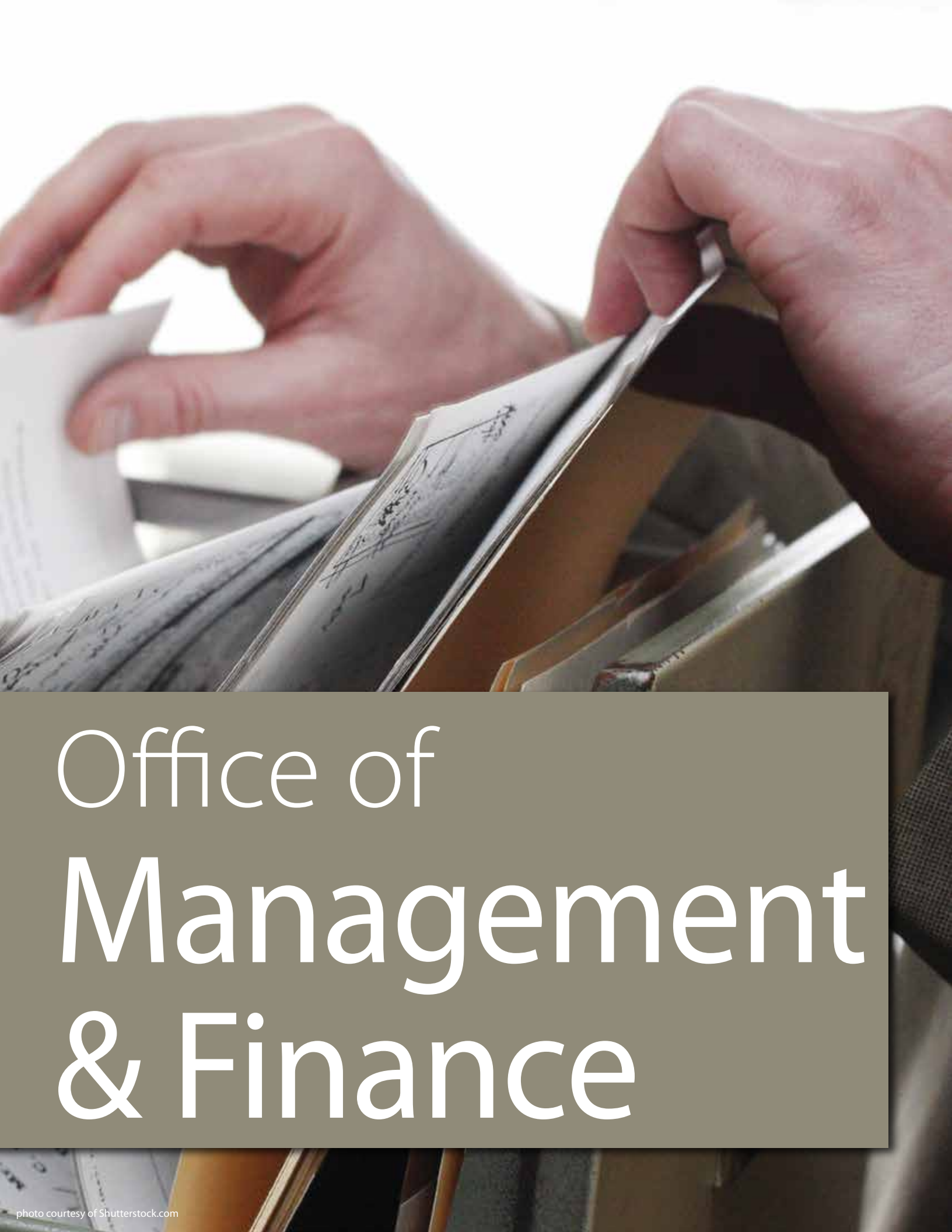
LEFT: *"Wildlife Insider" and "Friends of the Whooping Cranes" newsletters.*

ABOVE: *Trapping species trading cards.*
BELOW: *Whooping crane awareness billboard.*





LEFT TO RIGHT: *Common Louisiana species poster, Louisiana Conservationist magazine and Price of Paradise campaign.*



Office of Management & Finance

photo courtesy of Shutterstock.com

LICENSING

The Licensing Section serves as the information hub for more than 1 million customers who operate businesses, fish commercially, recreationally fish and hunt, and use state lands for non-consumptive purposes. The staff provides customers with state, federal and commission laws, rules and regulations that govern fishing, hunting and titling/registration of boats and motors in Louisiana. The Licensing Section handles the issuance of all commercial licenses, boat and motor title and registration services, and various permits; and manages the statewide electronic licensing system providing recreational license availability at more than 800 locations statewide. The Licensing Section continues to evaluate processes and streamline to improve availability and reduce processing time for licenses and boat titles and registrations.

License and boat and motor title/registration activities and related revenue collections are as follows:

- Issued in excess of 3 million recreational hunting, fishing, trapping and non-consumptive use licenses and permits sold to 800,000+ customers, generating in excess of $23 million in revenue. Maintained license records for in excess of 70,000 lifetime licensees.
- 61,000 commercial licenses sold, representing 11,000 commercial fishermen, 3,000 business entities, 900 charter businesses, and various permits that generate in excess of $4 million in revenue.
- 204,000 boat registration/title transactions that generated in excess of $4.4 million in revenue. Maintained boat data in excess of 1 million records - 319,000 of which are actively registered.
- Made available various types of game harvest tags to deer and turkey hunters and oyster tags to oyster fishermen and processors as required by federal and state law - in excess of 3.2 million.

PROPERTY CONTROL

The Property Control Section is responsible for managing LDWF's Property, Risk Management Insurance Claims, and Fleet Management programs. The section is staffed with three full-time employees and one student.

PROPERTY CONTROL PROGRAM

During FY 2017-2018, this program certified a moveable property inventory, which consisted of 10,736 items for a total acquisition cost of $80,452,848.16. Annually, the program is responsible for ensuring that a physical inventory of moveable property is conducted at its locations throughout the state.

FLEET MANAGEMENT PROGRAM

In accordance with state fleet management regulations this section records, approves and processes requests for personal assignment or home storage, daily vehicle usage, vehicle maintenance, and title, registrations and vehicle licenses for LDWF's approximately 600 fleet vehicles and 1,200 other licensed equipment.

RISK MANAGEMENT PROGRAM

The Property Control Section is responsible for filing insurance claims and recovering payment from the Office of Risk Management and third party insurance companies for property damage, automobile physical and liability damage, and wet marine, aviation, boiler and machinery damage. The section is also responsible for filing general liability insurance claims.

Driver's authorization and annual certification for LDWF's approximate 870 employees is also a responsibility of the Property Control section. This process is accomplished in accordance with Office of Risk Management's loss prevention guidelines.

FISCAL

The Fiscal Section staff consists of 15 employees who are responsible for all financial operations of LDWF. The main goal of the Fiscal Section is to achieve compliance with all applicable laws, rules, policies and regulations governing the functions managed, and to provide accurate and timely financial reports for all interested parties. This section also develops and implements fiscal controls, monitors program spending and provides advice, assistance and training, and standardizes procedures for approximately 900 employees.

The functions include:

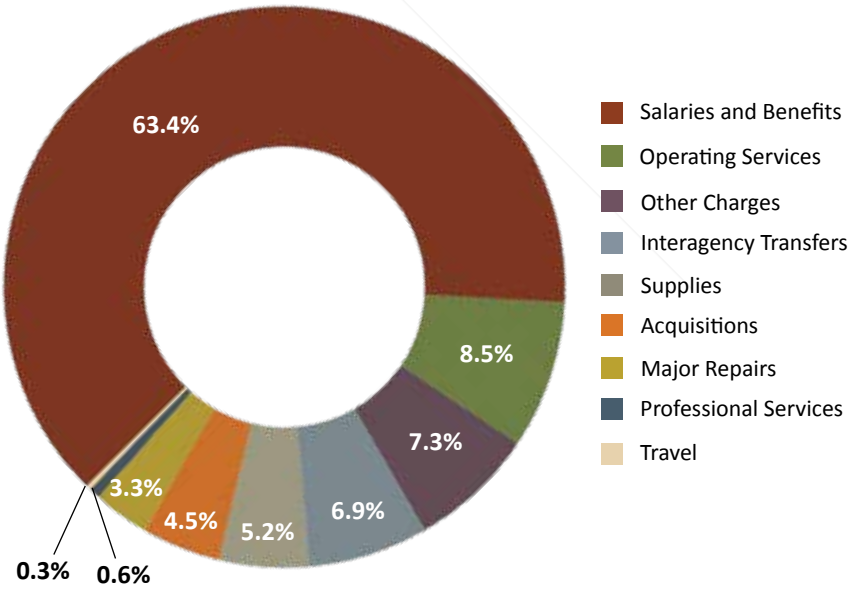
- preparation of the annual operating and capital outlay budgets.
- budget and expenditure control and monitoring.
- federal grant tracking and reporting.
- self-generated and interagency transfer agreement tracking and reporting.
- preparation of annual financial report.
- preparation of all required expenditure and fund financial reports.
- reviewing and processing professional, consulting, title 38 and Memorandum of Understanding contract payments.
- processing of employee purchasing card transactions.
- processing of employee travel reimbursements.
- payment of all vendors.
- receipt and classification of various sources of revenue.
- fund management.
- receipt of civil fines.
- strategic and operational planning.
- reviewing legislation and preparing fiscal notes.
- consulting with internal and external auditors on all financial audits.
- financial management of FEMA projects and other disasters.

During FY 2017-2018, the Fiscal Section staff:

- prepared four agency budgets consisting of five programs totaling $175 million.
- prepared department capital outlay budget totaling $152 million.
- audited and processed 410 contract invoices payments with a total amount payable of $9.9 million.
- processed 8,714 vendor invoice payments.
- audited and processed 13,762 purchasing card transactions.
- audited and processed 1,065 travel reimbursements.
- processed 431 checks through QuickBooks.
- warranted funds and prepared periodic reports for 124 federal grants.
- warranted funds and prepared periodic reports for 12 self-generated agreements.
- warranted funds and prepared periodic reports for 11 interagency agreements.
- deposited $35 million in receipts from various sources on 565 pay in vouchers.

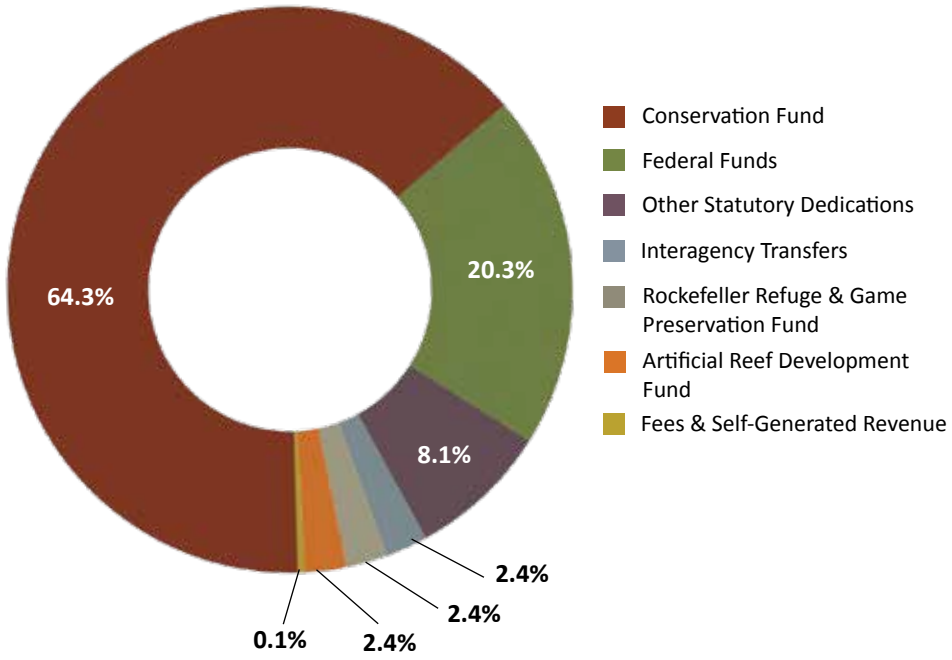
LDWF EXPENDITURES BY CATEGORY (FY 2017-2018)

Total Expenditures: $123,400,678



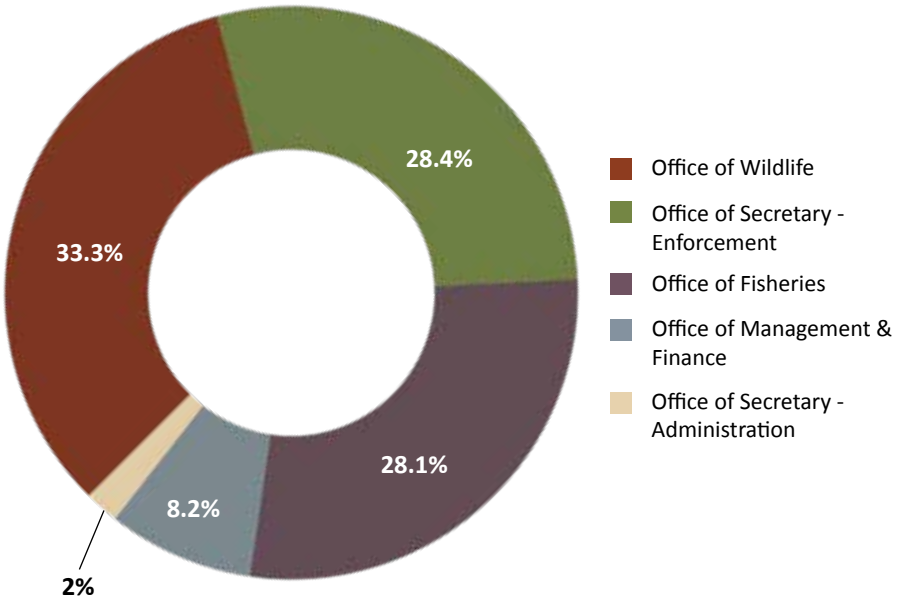
HOW EXPENDITURES WERE FUNDED (FY 2017-2018)

Total Means of Financing: $123,400,678



LDWF EXPENDITURES BY PROGRAM (FY 2017-2018)

Total Expenditures: $123,400,678

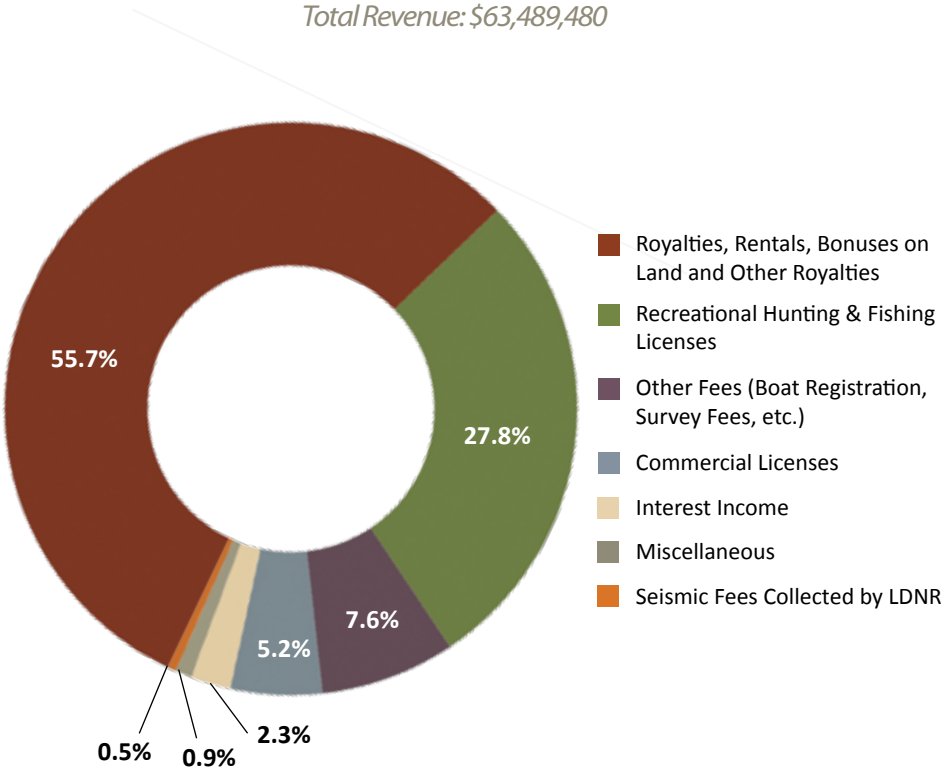


EXPENDITURES BY CATEGORY	
Salaries and Benefits	78,192,836
Operating Services	10,543,881
Other Charges	8,958,276
Interagency Transfers	8,515,717
Supplies	6,427,374
Acquisitions	5,563,061
Major Repairs	4,025,130
Professional Services	766,046
Travel	408,357
TOTAL	*$ 123,400,678*

HOW EXPENDITURES WERE FUNDED	
Conservation Fund	79,377,366
Federal Funds	25,088,446
Other Statutory Dedications	9,989,681
Interagency Transfers	2,956,113
Rockefeller Refuge & Game Preservation Fund	2,941,437
Artificial Reef Development Fund	2,933,740
Fees & Self-Generated Revenue	113,895
State General Fund	0
TOTAL	*$123,400,678*

SOURCES OF REVENUE TO THE CONSERVATION FUND (FY 2017-2018)

Total Revenue: $63,489,480



EXPENDITURES BY PROGRAM	
Office of Wildlife	41,107,741
Office of Secretary - Enforcement	35,080,933
Office of Fisheries	34,651,747
Office of Management & Finance	10,153,386
Office of Secretary - Administration	2,406,871
TOTAL	*$123,400,678*

SOURCES OF REVENUE TO THE CONSERVATION FUND	
Royalties, Rentals, Bonuses on Land, and Other Royalties	35,390,543
Recreational Hunting & Fishing Licenses	17,652,507
Other Fees (Boat Registration, Survey Fees, etc.)	4,837,930
Commercial Licenses	3,278,177
Interest Income	1,437,799
Miscellaneous	594,555
Seismic Fees Collected by LDNR	297,969
TOTAL	$63,489,480

HUMAN RESOURCES

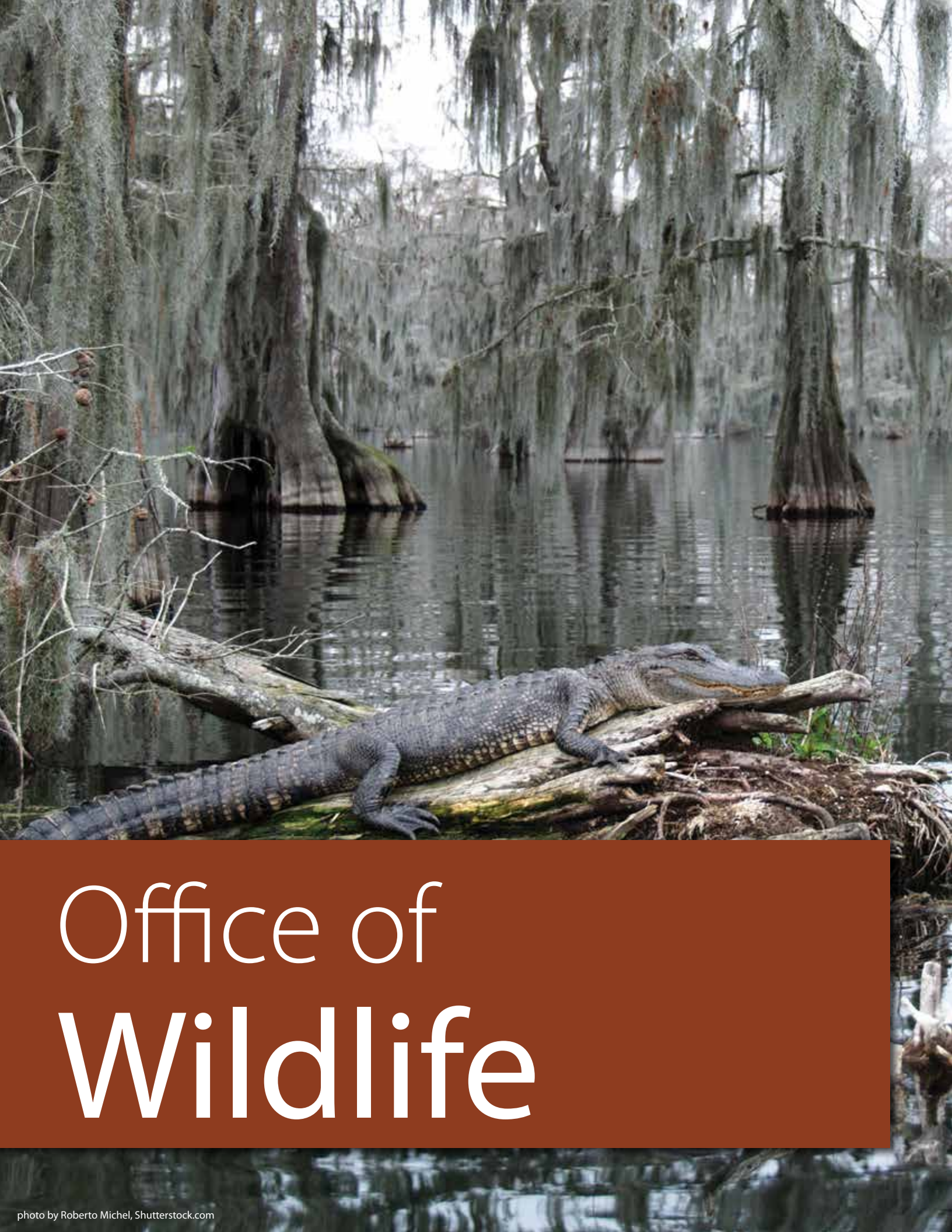
The Human Resources section originates and leads human resources practices and objectives that will provide an employee-oriented, high performance culture that emphasizes empowerment, quality, productivity and standards, goal attainment, and the recruitment and ongoing development of a superior workforce. The Human Resources section is actively involved in developing, organizing and carrying out programs, projects and operations through the exercise of personal efforts, knowledge and attention. Program areas consist of Organizational Development, Classification and Salary Administration, Recruiting, Selection and Placement, Affirmative Action, Employee Administration, Discipline, Grievances, Employee Relations, Performance Evaluation System, Employee Recognition, Benefits, Retirement, Payroll, Americans with Disabilities Act, Safety, Training and Development, Rewards and Recognition, Equal Employment Opportunity, FMLA, Fair Labor Standards Act, Policies and Procedures and Worker's Compensation. The section works to ensure all programs are in compliance with the Louisiana State Civil Service (SCS) rules as well as state and federal laws, regulations and guidelines.

The authorized number of funded positions for LDWF for FY 2017-2018 was 786. LDWF also employs students and other temporary employees throughout the state and had a total of 938 employees statewide.

The Human Resources section is responsible for the following duties:

- Advising agency personnel and clients on recruitment and staffing matters.
- Advising section heads, appointing authorities and managers on various appointment types and selection procedures in order to create and maintain a diverse workforce.
- Serving as a resource for layoff-related matters and for handling administrative aspects of the layoff process to maintain compliance with the SCS rules.
- Serving as the LDWF system administrator for the NeoGov (LaCareers) Online Hiring Center. Reviewed and distributed approximately 4,189 applications for employment for FY 2017-2018. Processed 114 hire confirmations in NeoGov during FY 2017-2018.
- Managing the notification process for the attainment of permanent status by probational employees and attainment of Career Progression Group eligibility for LDWF employees. Processed 78 Career Progression Group reallocations. Processed 45 permanent status actions.
- Developing the LDWF workforce plan and collaborating with LDWF sections to create workforce plans tailored to address specific needs/issues.
- Developing LDWF succession planning procedures.
- Managing compensation issues by reviewing pay schedules and ranges, and comparisons to other jobs and positions.
- Reviewing job specifications and position descriptions and making recommendations for classification and compensation issues.
- Managing the position description process as authorized by SCS. Reviewed and processed approximately 196 job descriptions during FY 2017-2018.
- Developing, recommending, implementing, reviewing, interpreting and revising all LDWF personnel and compensation policies.
- Advising managers and employees regarding the SCS system's classification and compensation, policies, rules and structure.
- Preparing job studies for submission to SCS.
- Working with agency administrators to develop and structure organizational units.
- Reviewing special pay requests for individuals under SCS rules: Optional Pay Adjustments; Rewards and Recognition; and other available pay mechanisms.
- Managing and advising requests for unclassified and classified authority. Monitoring appointment contract end dates and requesting extensions.
- Maintaining updates on federal and state labor law postings. Assisting LDWF sections in maintaining compliance with the Fair Labor Standards Act and other state/federal pay provisions.
- Coordinating the Human Resources Strategic Plan.
- Maintaining the LDWF Employee Handbook.
- Processing all personnel/payroll actions and various other documents relating to employee status to ensure data integrity and quality assurance are maintained in accordance with SCS rules and regulations, departmental/agency policies and procedures, and federal and state laws. There were approximately 1,388 personnel actions (new hires, agency transfers, reallocations, promotions, demotions, status changes, resignations, optional pay adjustments, market adjustments, schedule changes, etc.) during FY 2017-2018.
- Facilitating the annual audits of human resources practices conducted by SCS, the Louisiana State Employee's Retirement System, the Teacher's Retirement System of Louisiana, the Louisiana Legislative Auditors, and the LDWF internal audit section.
- Conducting time and attendance audits for all LDWF agencies and auxiliaries for compliance with policies and procedures established by LDWF and/or the Office of State Uniform Payroll. Processed approximately 1,256 prior period payroll adjustments during FY 2017-2018.
- Maintaining and/or monitoring organizational management, costing issues, and position authority in LaGov Human Capital Management.
- Assuring appropriate documentation is maintained for all employees in compliance with record and retention policies.
- Managing the human resources section of the OnBase paperless scanning system.
- Implementing onboarding program which aids new employees in acquiring the necessary knowledge, skills and behaviors to become effective organizational members.
- Assisting all active and retired employees for LDWF on all matters relating to retirement benefits.
- Advising managers, section heads and employees on available health and life insurance policies and other programs available.

- Developing course materials and providing orientation to all new employees for LDWF.
- Facilitating pre-employment drug testing and criminal history checks for all LDWF new employees. Managing the random drug testing process for active employees.
- Advising employees and coordinating with Office of Risk Management/Sedgwick concerning all issues relating to Workers' Compensation.
- Administering LDWF's Return to Duty policy for employee's suffering on-the-job illness/injury.
- Advising and training employees regarding the applicability and obligations of federal employment laws (Fair Labor Standard Act, Family Medical Leave Act, American's with Disabilities Act, and Title VII) and assisting in the interpretation and administration of those laws. Managing these programs for LDWF and our employees.
- Managing FMLA requests including providing and reviewing the required forms, establishing eligibility, approving/denying requests and maintaining quotas.
- Managing the claims made for unemployment by former employees of LDWF and clients. Processed approximately 119 separations from employment during FY 2017-2018.
- Administering the Performance Evaluation System including reporting statistics to SCS. Training managers on the effective use of the Performance Evaluation System program and advising managers regarding performance management. Processed over 768 performance evaluations and planning documents and entries required in LaGov Human Capital Management.
- Working with management to investigate and address performance and behavioral incidents, grievances, appeals and other personnel matters.
- Managing disciplinary actions, SCS appeals and litigation resulting from employment actions in accordance with SCS rules and federal and state law.
- Ensuring employee compliance with training required by law, departmental policies, SCS and Office of Risk Management.
- Monitoring compliance with Minimum Supervisory Training, training required by law and legislation such as Ethics and Sexual Harassment and required Office of Risk Management training such as defensive driving.
- Managing public record requests specific to Human Resources.
- Managing all required human resources reporting (i.e., annual drug testing reporting to the Division of Administration, annual reporting to SCS, annual reporting to the Office of Statewide Reporting and Accounting Policy, annual Affirmative Action reporting, etc.).
- Leading LDWF's safety program including, but not limited to, preparing Headquarters (non-Enforcement) for annual audits/compliance reviews; preparing quarterly safety meetings, providing assistance to field offices, maintaining-up-to-date Office of Risk Management training records and providing training reminders to employees, as necessary.
- Drafting and maintaining departmental policies. Heads policy committee.
- Identifying and bringing to the attention of management employee trends which need to be addressed, current developments in labor and employment law which would impact the department, recommending implementation of best Human Resources practices in dealing with all employee matters.
- Leading management development and supervisory training by providing training to supervisors and other management personnel beyond that required by the Comprehensive Public Training Program and ensuring that these employees are aware of required training and training resources.
- Managing all aspects of the Annual Statewide Charitable Contribution Campaign for the LDWF.



Office of Wildlife

photo by Roberto Michel, Shutterstock.com

WILDLIFE DIVISION

WILDLIFE RESEARCH

A wide range of research and management work is conducted in order to maintain healthy productive populations of wildlife and to provide wildlife associated recreational opportunities for citizens to enjoy. LDWF staff biologists conduct research and surveys for use in formulating hunting regulations and for development and management of habitat. They present information to the public and develop workshops for LDWF personnel and other agencies. In addition, the staff represents LDWF on state, regional and national committees, providing input to a wide array of public agencies, non-governmental organizations and private industry. The species programs are White-tailed Deer, Webless Migratory Birds, Wild Turkey and Resident Small Game, Waterfowl, Large Carnivore, and Wildlife Disease.

WHITE-TAILED DEER

During the statewide 2017-2018 deer season, 161,200 deer hunters harvested an estimated 135,100* white-tailed deer. The harvest-sex ratio from the license tag reporting system was 60 percent male and 40 percent female. The estimated number of deer harvested and hunters was derived from the annual mail survey. The mail survey has been used since 1970. **Senior hunters and harvest included in the mail survey*.

WMA hunters harvested 2,393 deer during the WMA-managed deer hunts, which was 5 percent above the 10-year average. LDWF staff collects biological data from deer harvested during the WMA-managed deer hunts through mandatory deer checks at designated weigh stations. Total WMA-managed deer hunt efforts were 22,862. The number of efforts to harvest a deer during the managed hunts was 8.8, which was the second best ratio over the past 10 seasons. Since the majority of WMA-managed hunts are held on two weekends, weather has an effect on success and participation. In general, conditions were favorable during the 2017-2018 managed hunts.

Mandatory tagging and reporting of deer entered the 10th year in 2017. The reporting system tallied 70,501 deer, an increase of 33 percent from the previous year. The total reported harvest, including WMA-managed hunts and Deer Management Assistance Program (DMAP) lands, was 86,779, up 26 percent from the previous year. If harvest data is under-reported, LDWF biologists and managers cannot make accurate determinations on hunting success and deer population parameters by parish. Compliance appears to have improved in 2017 after being lower but stable the previous four seasons. The compliance assessment is based on the comparison between the annual mail survey and license reporting system data. The license reporting system allows managers to collect harvest and deer sex data at the parish level.

DMAP provides detailed statewide harvest information while providing the largest known age sample of physical deer data. The DMAP harvest was 13,943 deer, a 6 percent increase over the previous year. The harvest rate was one deer per 112 acres compared to one deer per 118 acres the previous season. The DMAP harvest sex ratio was 40 percent male and 60 percent female. There were 710 clubs/cooperators with 1.55 million acres participating in the program. Enrollment was down less than 1 percent from the previous year. Critical habitat data was also collected in the form of browse surveys. 64 browse surveys were conducted on properties enrolled in DMAP during 2017-2018. Browse availability and utilization is recorded and assessed on the browse transect survey. These indices provide managers an in depth analysis between available browse resources and utilization on the landscape. DMAP cooperators continue to harvest a high percentage (72 percent) of 3.5-year-old and older age bucks. That number was good enough to be third best in the nation in the most recent 2018 Quality Deer Management Association Whitetail Report.

Deer harvest information from across the state was evaluated. Harvest data is assessed at the parish, deer management area and statewide level. Deer regulations are influenced by this evaluation. Additional analysis of DMAP and WMA harvest data is included when assessing statewide harvest trends and herd health.

Bucks harvested during 2017-2018 meeting minimum qualifications for the Louisiana Big Game Records Recognition Program were documented in the annual Deer Program report. A total of 30 bucks met the minimum qualification for the recognition program. In addition, 15 of the 30 bucks that met the recognition program requirements also qualified for the all-time State Records List. Two bucks qualified for the Boone and Crockett record book and six bucks harvested with bows qualified for Pope & Young. The Louisiana Big Game Records Recognition Program and State Records List are available on the LDWF website.

In order to better manage Louisiana's white-tailed deer herd, both university and Deer Program research is conducted. Herd health collections along with disease and parasite investigations continued on both private and public lands. Additional breeding data is also gathered during these collections. Breeding data for over 1,200 deer have been used to assign breeding chronology to all areas of Louisiana. This data has been critical for establishing season time frames within each deer management area. Additional deer research includes Protocol Validation for Genetic Differentiation of Wild and Pen-raised White-tailed Deer. The protocol and technique developed successfully differentiated wild and pen-raised deer. Research findings show that breeding-pen populations can be distinguished from native deer using genetic assignment methodologies. In addition, wild deer were sampled across the state providing a bank of DNA for future comparison and analysis. The technique utilized tissues easily collected and stored for analysis. This has already aided LDWF in the development of protocols for DNA sampling. Standardized tissue collection and positive assignment of each sample has reduced the chance of inconclusive results. The ability to distinguish between pen-raised and wild deer will provide immediate application during current chronic wasting disease (CWD) surveillance efforts. In the event of a positive, it will be possible to distinguish between native wild deer and pen-raised deer. This will shape the response and answer questions regarding origin of the disease.

More than 592 serological tests for bluetongue virus, epizootic hemorrhagic virus, leptospirosis and brucellosis were conducted for white-tailed deer. In addition, the recent discovery of CWD in Issaquena, Mississippi, has led to increased surveillance in northeast Louisiana. Cooperating landowners in East Carroll, Madison and Tensas parishes have provided access to their properties for the purpose of sampling in response to the CWD positive in Mississippi. Their cooperation and willingness to assist has been critical in assessing the extent of CWD in that region. Collection efforts began on March 12 and extended into May. During that time, LDWF sampled 300 deer within the 25-mile buffer zone, all of which were classified as "CWD not detected" by Texas A&M's diagnostic lab. The target number of 300 was based on the probability of detecting one positive at a 1 percent prevalence rate with 95 percent confidence. In addition to the 300 samples collected from northeast Louisiana, 422 statewide samples were collected for a total of 722 CWD samples in 2017-2018 (9,000 since 2002). To date, CWD has not been detected in Louisiana.

WEBLESS MIGRATORY BIRDS

DOVE

Mourning dove call counts were conducted along established routes throughout Louisiana. With the new mourning dove harvest strategy, USFWS is no longer collecting dove call count data from states. However, a modified dove call count is being tested by several states including Louisiana. Louisiana collected dove data along the established dove call count survey routes. In addition to collecting data on mourning dove trends, data on white-winged and collared doves were collected. Collared doves were detected on seven of the 19 routes. Three white-winged doves and 24 collared doves were detected during the counts.

Dove hunting regulations for Louisiana in 2017-2018 were set at 90 days with a bag limit of 15 birds. A survey of resident license holders indicates that approximately 21,900 Louisiana hunters harvested approximately 419,500 doves during the 2017-2018 hunting season. An estimated 27,000 Eurasian collared-doves and 34,200 white-winged doves were also taken.

In addition to dove fields on 12 WMAs, LDWF leases property from private landowners for public hunting. This land is leased for public hunting on opening day only. In 2017, one field totaling 350 acres was leased. During the opening day hunt, 115 hunters participated, bagging 113 doves.

In the spring of 2003, USFWS adopted a National Mourning Dove Harvest Management Plan. Determining current harvest rate in each management unit was identified as a key component of the plan. Wildlife Division personnel banded 1,258 doves during July-August 2017 as part of a national effort to provide information needed to develop harvest rate estimates for mourning doves. Another aspect of this study has been the development of production indices from mourning dove wings collected from hunters. A Wildlife Division biologist participated in the annual Mourning Dove Wing Bee held in Missouri. During a three-day period, state and federal biologists from across the country aged more than 40,000 wings.

WOODCOCK

Beginning November 2017, LDWF began a study on hunting-induced mortality of American woodcock. Four-hundred-forty-six woodcock were banded as part of this project. This project is ongoing.

LDWF co-hosted the USFWS Annual Woodcock Wing Bee in 2017 in conjunction with LSU. Data derived from aging and sexing about 12,000 woodcock wings were used to develop trend data on woodcock production and hunter success. These data, in combination with breeding bird surveys, are used to develop management strategies for woodcock. Although many people in Louisiana consider woodcock an under-utilized species, Louisiana's harvest of woodcock at one time ranked among the nation's highest. However, the number of woodcock hunters has decreased by over 90 percent since their peak in the early 1980s. Nonetheless, Louisiana still consistently ranks fourth in the nation for woodcock harvest. A survey of resident license holders indicates that approximately 3,000 Louisiana hunters harvested 11,500 woodcock during the 2017-2018 season.

ANNUAL HUNTER HARVEST SURVEY

Big and small game harvest indices for the 2017-2018 hunting season were obtained through a mail survey based on the purchasers of basic resident hunting licenses or any other resident license that included the basic resident hunting privileges for 2017-2018. The 2017-2018 Game Harvest Survey was mailed to 16,089 (6 percent sample) residents who had purchased the license for the current year's hunting season (or had a lifetime license). The survey questionnaires were completed and returned by 3,595 individuals before the cutoff date. The estimated harvest and hunter efforts for the 2017-2018 hunting seasons utilized 2,156 responses. The procedures used to calculate the 2017-2018 estimates were the same as those used for the 2016-2017 harvest estimates. The 2017-2018 harvest estimates were extrapolated based on the current year's license sales of 232,371. Hunter numbers reflect those that hunted a species even if they did not bag. No attempt was made to adjust the statistics to compensate for the lack of residents under 16 years old who are not required to purchase a basic license.

WILD TURKEY & RESIDENT SMALL GAME

WILD TURKEY

The most recent turkey hunter survey estimated 13,500 turkey hunters harvested approximately 3,000 wild turkeys during the spring of 2018. These numbers do not include youth and exempted hunters. The number of recreational days spent turkey hunting (76,300) was down significantly in 2017 compared to 2016 (121,900).

A poult production survey was initiated in 1994 to assess annual brood rearing success and monitor long-term production trends. The 2017 survey indicated a similar hatch in four of the five habitat regions over 2016 data. The Southeast Loblolly, North Mississippi Delta, Western Longleaf, and Atchafalaya/Lower Mississippi Delta all experienced similar production from the previous year. Production in the Northwest Lobololly/Shortleaf/ Hardwood region increased in 2017. However, production was below the long-term (1994-present) average in all management regions.

LDWF is involved in several wild turkey research projects. A research project has been implemented on Peason Ridge WMA and Kisatchie National Forest to study female wild turkey movements and production in relation to habitat improvements. This work is being done in conjunction with LSU and U.S. Forest Service (USFS) and is scheduled for completion in 2021. LDWF is also engaged in banding gobblers on all five ranger districts

Installing transmitter on turkey at Peason Ridge WMA

of the Kisatchie National Forest. Banding and subsequent reporting by hunters of banded gobblers provides information needed to estimate wild turkey harvest rates. Information collected to date has helped justify expanded youth hunting opportunities on Kisatchie National Forest.

SMALL GAME

Squirrels and Rabbits

Small game populations and harvests are highly dependent on year-to-year habitat conditions. As a result, it is common to see more variation in populations and harvests of small game species when compared to other species from one year to the next. The 2017-2018 harvest survey results indicate that there were approximately 72,600 squirrel hunters in Louisiana, which is a decrease of 19 percent from 2016-2017. Total harvest estimates also decreased 21.2 percent to 1,141,800 squirrels for 2017-2018. The number of rabbit hunters is estimated at 24,300, which is a decrease from the previous year. In addition, estimated harvests decreased 40.7 percent from the previous year to 116,500.

To expand small game hunting opportunity, LDWF has established Small Game Emphasis Areas on the following WMAs: Big Colewa Bayou, Bayou Macon, Bayou Pierre, Boeuf, Dewey Wills, Pomme de Terre, Richard K. Yancey, Russell Sage, Sandy Hollow, Sherburne, Tunica Hills, and Walnut Hill WMAs. Within these WMAs on that portion designated as the Small Game Emphasis Area, small game hunting and training with dogs is allowed for extended periods of time throughout the season and year. Specific dates vary as hunting regulations indicate each year.

LDWF staff have also implemented a research project in southeast Louisiana assessing home range size and habitat use of Bachman's fox squirrels.

Quail

Statewide fall whistling counts were conducted on 21 randomly located routes and an additional five routes on LDWF WMAs and the Kisatchie National Forest. All regions continue to exhibit significant long-term (1983-2015) declines in calls per stop. Spring bobwhite surveys were also conducted on the Sandy Hollow WMA, Kisatchie National Forest and Hodges Garden State Park. Inferences about population status and habitat conditions were developed based on the results of these surveys during the breeding season.

A survey of resident license holders indicates that approximately 860 Louisiana hunters harvested 2,800 wild quail during the 2017-2018 season. Hunters were also asked about their harvest of pen-raised quail. About 1,100 hunters harvested over 16,900 pen-raised quail.

LDWF continues to work with its partners to address the decline in bobwhite populations. Habitat development efforts using U.S. Department of Agriculture (USDA) Farm Bill programs and the State Wildlife Grants Program have been implemented to promote management practices such as prescribed burning. LDWF is also partnering with the USFS to assist in habitat management on a Quail Emphasis Area on Kisatchie National Forest to promote and develop quail habitat on approximately 6,000 acres.

WATERFOWL

Louisiana has approximately 3.5 million acres of coastal marsh that winter large and diverse waterfowl populations. Aerial waterfowl inventories of the entire coastal marsh, as well as associated agricultural lands in north central and northeast Louisiana, are conducted each winter.

The mid-winter inventory conducted in early January 2018 maintained traditional methods in all surveyed regions. LDWF has completed the transition to flying mid-winter goose surveys in coastal Louisiana and total waterfowl surveys in parts of central and northern Louisiana to gather important data trends for those populations. This was necessitated when USFWS stopped flying those surveys. In 2017 LDWF flew using retired USFWS personnel to train our staff, and in 2018 LDWF took over the survey completely. The mid-winter survey indicated 3.5 million ducks and 674,000 geese wintered in coastal marsh and inland areas of the Mississippi Delta. This was 26 percent more ducks than 2017 and 14 percent above the most recent 10-year average. The goose count was up 31 percent from 2017, is similar, and is 5 percent above the most recent 10-year average. The previous two years brought above-average December aerial waterfowl surveys, followed by unseasonably warm temperatures and rainfall up and down the Mississippi Flyway, which seemed to halt or even reverse migrations, leading to a large decline in the survey estimates for coastal Louisiana and Catahoula Lake between the December and

January surveys. Unlike those last two years, very cold temperatures brought frozen wetland conditions all the way to the coast of Louisiana during early January 2018 providing conditions expected to move large numbers of birds into our state. However, estimates from December (3.02 million) and January (3.07 million) were about the same. Ice-cover on important winter habitats across the state may have led to lower estimates than expected as birds sought open water on typically un-surveyed habitats such as the open bays and the Gulf of Mexico. However, estimates were low, especially for normally abundant species such as gadwalls and American coots. For the second consecutive year, scaup estimated from transects flown on Lakes Maurepas, Pontchartrain and Borgne declined from December despite the continued cold weather in January. The 9,200 was a 36 percent decline from the December estimate, was 87 percent below last January's estimate of 70,000, and was only 6 percent of the most recent 10-year average of 162,700. Scaup estimates from this survey vary substantially, but this was the fifth lowest January estimate since 2001. Geese are only counted in northeast Louisiana prior to January, and counts in that area were slightly above the 10-year average at 219,000 in December, but fell to only 68,000 in January. However, that estimate was clearly affected by freezing temperatures and movement of geese to the south as evidenced of the slightly above-average total goose estimate from the statewide January survey. White-fronted geese, a species of particular importance to Louisiana goose hunters, increased from 89,000 in January 2017, to 151,000, the highest count on record for this survey in January 2018.

Based on federal harvest estimates, 47,000 active duck hunters harvested 1,084,000 ducks during the 2017-2018 season. That Is a 6 percent decline in active hunters but a 26 percent increase in duck harvest, almost certainly due to substantially colder weather and higher duck populations in January. As described the past two years, federal estimates are inconsistent with LDWF hunting license and results from the Big and Small Game Survey, which reported 61,000 active waterfowl hunters killed 1,670,000 ducks. Those estimates indicated a 22 percent decline in active duck hunters and a 28 percent decline total duck harvest. Other Mississippi Flyway states reported similar discrepancies in hunter numbers relative to the federal estimates. Improvements in the federal harvest data are necessary because they provide the species composition and age-ratio of the harvest, and the data are species, time and location specific within each state. State estimates do not include a collection of parts (wings) that allows estimation of species-specific harvest and large-scale reproductive success necessary for most population models. An increase in estimated harvest was expected because of harsh mid-winter weather, but reported hunting success was disappointing. Per-hunter success declined from 29.3 in 2016-2017 to 27.3 in 2017-2018 according to LDWF's Big and Small Game Harvest Survey, but increased from 17.2 to 23.1 according to the federal harvest surveys, more evidence of the need to evaluate and improve harvest estimate methodology. The federal-estimated harvest of 1,084,000 ducks included 20 percent blue-winged teal, 20 percent green-winged teal, 16 percent gadwall, 8 percent lesser scaup, and 8 percent mallard. Wood duck, ring-necked duck, northern shoveler, mottled duck, pintail, widgeon, canvasback, bufflehead, and redhead comprised the remainder.

Goose hunters in Louisiana harvested 75,000 geese during the 2017-2018 hunting season, a 25 percent decline from the previous year. The spring breeding habitat conditions were considered to be below average with a late spring, and less than average reproduction was expected. The fall staging survey of white-fronted geese declined 23 percent from the previous year to 772,000 but the three-year average remains over 900,000, which is well above the 600,000 threshold to maintain liberalized harvest regulations implemented in 2016. White-fronted geese made up 55,000 (or 73 percent) of the total goose harvest. Snow, Ross' and Canada geese made up the rest of the goose harvest.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Louisiana continues to play an important role in the North American Waterfowl Management Plan. LDWF strives to maintain ongoing projects and other activities associated with the North American Waterfowl Management Plan. In FY 2017-2018, North American Wetland Conservation Act (NAWCA) construction projects at Pomme de Terre and Boeuf WMA were completed. These projects include replacing two large dilapidated water control structures and screwgates with large weirs and stop-log structures at Pomme de Terre and construction of a dependable water delivery system for impoundments at Boeuf WMA. Additional NAWCA grants are being developed for Russell Sage and Sherburne WMAs. These projects will increase waterfowl habitat and better enable shallow water management for wintering waterfowl.

Prolonged high water levels and disputed land ownership again minimized undesirable vegetative treatments on Catahoula Lake during FY 2017-2018. Planned bulldozing activities were not conducted. Herbicide applications were conducted on Sherburne's Des Ourses Swamp and North and South Farms and several other WMAs. Many other mechanical, chemical and prescribed fire treatments were conducted on other WMAs to invigorate wetlands and improve hunter access.

Pump installation at Boeuf WMA

WOOD DUCKS

During 2017-2018, LDWF banded 2,263 wood ducks, which is nearly the same as the 2,240 banded the previous year. That is 31 percent fewer than the 3,243 banded in 2015-2016, which was the highest total since our banding program was established in 1992. Pre-season rocket-netting accounted for 1,986 of the total bandings, and 277 hens were captured in nesting boxes. In addition, 3,350 black-bellied whistling ducks were banded during the winter and spring. This is almost the same as in 2016-2017 and is the second consecutive year with over 3,200 banded, and maintains the continuous banding of large numbers of black-bellied whistling ducks necessary to build/maintain a recapture database. The North American Waterfowl Management Plan Coordinator continues to adjust the number of banding sites to build a more representative database that may have to depend on recaptures rather than hunter-recoveries to obtain information on movement and survival of these birds and support future harvest management decisions.

The wood duck nest-box program completed its 29th year in 2018. LDWF personnel are maintaining 2,058 boxes currently in use. That is a slight decline from last year but about the target level of 2,000 boxes. Replacement of deteriorating boxes and those lost to flooding, as well as relocating both unused boxes and those with high rates of dump-nesting to more suitable habitat continue to be primary activities of this program. The program goal is 2,000 boxes, but we expect the number of boxes maintained and monitored through landowners in the Private Lands Program to continue to increase. Utilization was monitored at 2,017 boxes, which was an increase over the 1,975 monitoring last year and the second consecutive year of increased monitoring. Utilization has ranged from 45-100 percent in past years with an average utilization of about 80 percent.

LARGE CARNIVORE PROGRAM

LARGE CARNIVORE RESEARCH

Of the 16 American black bear subspecies, the Louisiana black bear is the only to have received formal protection under the United States Endangered Species Act; listed as threatened in 1992. Recovery and delisting of the bear occurred in April 2016. Therefore, LDWF's current bear research efforts are mostly targeted at long-term monitoring to collect the critical demographic, genetic and spatial information required to effectively monitor population health. This information will also be used to sustainably manage bear populations as part of a seven-year Post-Delisting Monitoring Plan that the Large Carnivore Program and USFWS finalized during 2015.

2017-2018 Bear Research

1. Reproductive Vital Rates -
To collect information on reproductive vital rates, we conducted 48 adult female den visits across all four bear subpopulations during February and March 2018 to count and mark cubs-of-the-year, and to count yearlings. From these efforts, we estimated an average litter size of 1.6 cubs for the metapopulation (i.e., all four subpopulations combined).

2. Survival and Mortality -
To monitor survival and cause-specific mortality, we live-captured 30 bears and outfitted these individuals with VHF or VHF-GPS radio-collars, or marked bears based on sex and age class. Using monthly aerial telemetry, we monitored 48 radio-collared bears from all four subpopulations during 2017-2018. We documented 53 mortalities during FY 2017-2018, 75 percent of which was from roadkills.

3. Abundance, Density and Growth -
To estimate abundance and density and monitor temporal changes in population growth, we conducted our 11th consecutive year of non-invasive hair trapping in the Tensas River and Upper Atchafalaya River Basin subpopulations during May through July 2018. Samples were collected from 209 and 116 sites in both subpopulations, respectively, resulting in 4,256 individual hair samples. All collected samples were sent to Wildlife Genetics International for microsatellite genotyping at eight to 21 markers, depending on study objectives.

BEAR MANAGEMENT

LDWF personnel responded to 214 human-bear conflict calls from the public and other government agencies. Response varied from technical assistance being provided over the phone to site visits with recommendations provided to reduce conflict and trapping. During FY 2017–2018, we captured five bears to address human-bear conflict issues reported to LDWF, primarily in the Lower Atchafalaya River Basin subpopulation.

The Large Carnivore Program Manager presented a bear workshop to the LDWF Law Enforcement Cadet Class and the St. Mary Parish Sheriff Office on bear behavior and biology and bear conflict response.

Work continued with the U.S. Geological Survey (USGS) to improve the BearTrak database, and USGS is working to update and add additional features to the online database.

EDUCATION AND OUTREACH

The Large Carnivore Program Manager worked with the Southeast Association of Fish and Wildlife Agencies Large Carnivore Working Group to produce a regional bear website to act as a source of public information to address any and all forms of bear conflict occurring in the southeast. This resource can be used by members of the public to minimize and mitigate bear conflicts; as well as assist communities wishing to engage in a community-based initiative.

In continuation of our black bear outreach, the majority of efforts conducted in FY 2017-2018 centered on exhibition and presentation of information to schools and other interest groups around the state. Key outreach events for the year included National Hunting and Fishing Day (Woodworth), Family Adventure Day (Lafayette), and various summer camps across the state. Cumulatively, over 2,100 individuals received information pertaining to the Louisiana black bear at these events.

The large educational library display was moved on a bi-monthly basis to libraries across the state. In addition, a Paradise Louisiana display was created that included bear information. To date, the displays have been hosted at six headquarter library locations in the parishes of Rapides, LaSalle, St. Martin, Lafayette, Livingston and St. Tammany.

Bear Safety in Mind (St. Mary Parish Program)

Accomplishments during 2017-2018 include:

- Maintained close communications with biologist to assist specific call areas by working with caller reporting the nuisance bear behavior to ensure all bear proofing efforts were being implemented in the area with the nuisance bear problems.
- Daily monitoring of bear proof cans to assist the homeowner or small business with questions, damages and procedures to further bear proof their property and facilities.

- Worked closely with Pelican Waste to monitor bear proof cans concerning residential and small business compliance with waste hauler and new procedures for services.
- Distribution and door to door contact with residents providing written information in hand out bags in targeted areas reporting bear activities: Franklin areas of Yokely Road, Irish Bend Road, Katy Circle, Oaklawn Manner Subdivision, Eastwood Subdivision, MaryLee Street, North Luke Street and Iberia St. at Chatsworth Road; Centerville, Verdunville and Verdunville Road areas
- Assisted with nuisance bear calls and added bear proof garbage cans at Vacherie Plantation.
- Assisted residents with repairs for bear proof cans and nuisance bear activities on Gibbs Road, Hwy 318, Cypremort Road, Hunting Road, Ricohoc, Highway 317, Centerville and Crescent Acres in Patterson.
- Worked with a local fabrication shop in St. Mary Parish on manufacturing bear proof cans, along with providing repairs to the cans and replacement parts for the bear proof cans.
- Attended the Fifth International Human-Bear Conflicts Workshop in Gatlinburg, Tennessee.
- Due to the increased number of nuisance bear reports and requests for bear proof garbage cans, LDWF worked with Parish Council Members, Parish Administration, City of Patterson Officials and Pelican Waste & Debris to expand the use of bear proof garbage cans into the Patterson, Centerville, Verdunville and Verdunville Road areas. These changes will be effective when the waste contract come up for renewal in 2020.
- Worked on the Black Bear Festival board of directors to participate with the black bear informational & educational activities for the festival
- Due to the increased number of bear proof garbage cans in use and the cost for such cans, an order was placed and received for 40 new Growler bear-proof cans to help with the continued demand for expansion of the use of bear proof cans. In addition an order for inside locking brackets was placed and received to continue maintenance on the 2,200 cans in use.
- Worked with Patricia Crow of Crow's Nest Landing RV Park to implement the use of a bear proof dumpster and worked with Michael Spillman to have bear proof dumpsters implemented at the Bayside Apartment complex in Berwick located along Highway 182. Signs were provided for the dumpsters reminding the residents to close the dumpster doors after use.
- Provided bear proofing information to Bernie David at the Cote Blanche Mine on Weeks Island.

WILDLIFE DISEASE

The statewide Wildlife Disease Program was administered by the State Wildlife Veterinarian, the Assistant State Wildlife Veterinarian, and the Wildlife Disease Biologist.

The Wildlife Disease Program conducted disease surveillance on white-tailed deer. As part of the LDWF herd heath monitoring program, 50 samples were submitted for serological analysis of *Brucella spp*., infectious bovine rhinotracheitis, bovine viral diarrhea virus, and bovine parainfluenza-3 virus. Three hundred thirty-eight samples were submitted for bluetongue virus and epizootic hemorrhagic disease virus, 577 for *Leptospira interrogans* and 593 for *Histophilus somni*. Serologic samples were submitted to the Southeastern Cooperative Wildlife Disease Study and Texas A&M Veterinary Medical Diagnostic Laboratory. Zero samples were sero-positive for *Brucella spp*., infectious bovine rhinotracheitis, and bovine viral diarrhea virus. Ten percent of samples were sero-positive for bovine parainfluenza-3, 59.47 percent for bluetongue virus, 69.23 percent for epizootic hemorrhagic disease virus, 13 percent for leptospirosis, and 3.20 percent for *H. somni*. In addition, 678 samples were collected statewide for CWD surveillance. Samples were submitted to the Texas A&M Veterinary Medical Diagnosis Laboratory. No samples tested positive. This brings the total number of wild white-tailed deer tested in Louisiana to 8,908 animals since the inception of the program in 2002.

To date, a total of 1,251 and 1,257 feral swine from non-WMA lands have been tested for swine brucellosis and pseudorabies, respectively. Thirty-four (2.71 percent) were serologically positive for swine brucellosis. One hundred twenty-six (10.02 percent) were positive for pseudorabies. In addition, 299/557 samples (53.68 percent) were positive for leptospirosis.

Additional projects included studies of white-nose syndrome surveillance, population monitoring and winter use of transportation structures for bat species, feral hog stomach contents, feral hog toxicant research, examining the role of wildlife as Leptospira reservoirs, and coyote stomach content evaluation.

Disease investigations included mortality events involving waterfowl and red-eared sliders as well as numerous individual mortality events including, but not limited to, raccoons, opossums, squirrels, white-tailed deer and Louisiana black bears.

LAND DEVELOPMENT & MANAGEMENT

FORESTRY PROGRAM

The mission of the Forest Management Program is to improve forest and wildlife habitat on WMAs through sound forest management, reforestation practices, and active forest/wildlife research activities. To this end, LDWF's 490,000 acres of forestland has been certified through the Sustainable Forestry Initiative Program. LDWF completed its first surveillance audit and was found to be in accordance with the requirements of the Sustainable Forestry Initiative Standard 2015-19.

General forest inventories and habitat evaluations were conducted to facilitate the development of management prescriptions for Big Lake, Buckhorn, Dewey Wills, Little River, Pomme de Terre, Richard K. Yancey, Russell Sage, Sherburne, and Spring Bayou WMAs.

Harvest preparations including forest inventory, regeneration evaluations, timber marking, GIS map development, timber sale proposal preparations, timber sale development, contract development, and timber contract amendments were conducted on Bayou Macon, Boeuf, Grassy Lake, Little River, Richard K. Yancey, Russell Sage, Sandy Hollow, and Sherburne WMAs. Harvests to improve wildlife habitat were initiated and/or completed on Bayou Macon, Boeuf, Little River, Richard K. Yancey, Russell Sage, Sandy Hollow, and Sherburne WMA.

Chemical treatments of invasive/non-native species, primarily Chinese tallow tree, cogon grass and trifoliate orange were carried out on Alexander State Forest, Big Lake, Dewey Wills, Pomme de Terre, Sandy Hollow, and Spring Bayou WMAs. Herbicide applications to improve habitat through midstory removal were conducted on Alexander State Forest and Sandy Hollow WMA.

Prescribed burning treatments were conducted on Alexander State Forest, Lake Ramsay, Little River and Sandy Hollow WMAs to promote and improve habitat conditions for fire-dependent wildlife and plants.

The annual statewide WMA Mast Survey was conducted to estimate annual mast production. The survey is used as an indicator of mast availability for wildlife as well as a predictor of small mammal populations. The mast survey is also used to map local abundance which aids in seed collection efforts.

Our reforestation program inventoried and evaluated hardwood plantations on LDWF-owned WMAs, as well as private properties. Habitat evaluations and management plans were developed for six bottomland hardwood restoration sites on properties enrolled in the USDA - Natural Resources Conservation Service's (USDA-NRCS) Wetland Reserve Program. Evaluations of state-owned properties include Pomme de Terre, Richard K. Yancey and Russell Sage WMAs. Research continued on several ongoing studies investigating seedling survival, sapling development, tree growth and wildlife response to various silvicultural treatments. Hardwood seedlings (Nuttall oak) were planted on Grassy Lake WMA as part of a species enrichment effort associated with a prescribed timber harvest/habitat treatment.

Our GIS program continues to update timber sale data, forest inventory, boundaries, prescribed burning, roads and streams data input relative to our WMA forest management activities. The forestry GIS allows us to monitor, analyze and evaluate for performance and outcomes of the entire forestry program.

Growth Monitoring Plots were reevaluated on Bayou Bacon, Buckhorn and Pearl River WMAs. These permanent plots aid in monitoring habitat conditions and effects of our forest management program on the habitat components represented on the WMAs.

Forestry Section personnel performed red-cockaded woodpecker demographic monitoring and management for 13 red-cockaded woodpecker family groups at Alexander State Forest WMA located in Woodworth, Louisiana These activities included annual activity status checks of over 200 red-cockaded woodpecker cavity trees, nest checks, nestling color banding, fledgling checks to determine survivorship, artificial cavity installation and

Herbicide application at Sandy Hollow WMA.

Continuing education workshop on bottomland hardwood silviculture at Richard K. Yancey WMA.

maintenance, and midstory control in 14 red-cockaded woodpecker cluster sites. In addition, Forestry Section personnel performed demographic monitoring and management for 16 red-cockaded woodpecker family groups at Big Branch Marsh National Wildlife Refuge located in Lacombe, Louisiana

Forestry Section personnel continued to administer the Red-cockaded Woodpecker Safe Harbor Program. Forestry Section personnel provided technical assistance to private landowners managing red-cockaded woodpeckers and their habitat.

Other survey and research projects on the WMAs that were supported by Forestry Section staff involved wildlife use of forested habitats and their response to various silvicultural treatments. Forestry Section staff hosted several training and outreach workshops to share research results and management experiences. Continuing education for the Forestry Section staff was practiced through participation at various symposiums, workshops, seminars, research meetings and conferences throughout the year, in and out-of-state.

WILDLIFE MANAGEMENT AREAS

The Wildlife Division of LDWF currently manages over 1 million acres in its WMA Program. These areas are distributed across the state and are comprised of a vast array of habitat types. The WMA Program's mission is to deliver conservation priorities to Louisiana's landscape, as well as provide an array of outdoor recreational opportunities to the public. The lands in the program serve to protect, conserve, replenish and manage the wildlife resources occurring on those areas. Habitats within these lands harbor and help conserve a multitude of endangered species such as the Louisiana black bear, red-cockaded woodpecker and gopher tortoise. The majority of these lands are available for the public to utilize in recreational pursuits. Recreational opportunities range from a variety of hunting and fishing, to canoeing, hiking, ATV riding and berry picking. Habitats range from upland pine-hardwood, to cypress tupelo, pine savanna, bottomland hardwood, brackish marsh, and the list goes on with many globally rare habitat types and plant communities as well. For administrative and management purposes, the WMAs are grouped by region - Hammond, Lafayette, Lake Charles, Pineville, Monroe and Minden regions.

HAMMOND

Wildlife Management Areas (*Total Acres - 245,849 acres*)

- Biloxi
- Hutchinson Creek
- Joyce
- Lake Ramsey Savannah
- Manchac
- Maurepas Swamp
- Pearl River
- Sandy Hollow
- Tangipahoa Parish School Board
- Tunica Hills

Habitat types on these WMAs include marshes and swamps, natural longleaf and plantation loblolly pine stands, bottomland hardwoods, and rugged loess bluff uplands.

A total of 63,306 user days were estimated for Hammond WMAs during FY 2017-2018. An alligator season was available on Joyce, Manchac, Maurepas Swamp and Pearl River WMAs with a harvest of 1,158 alligators by 16 commercial alligator trappers. LDWF received $15,293 in revenue from commercial alligator harvest on Hammond WMAs. Recreational alligator harvest opportunities were also made available to the public. To facilitate recreational alligator harvest, 60 additional people were selected by lottery, issued three tags each, and harvested an additional 135 alligators on these four areas. Alligator egg collections were monitored by Hammond WMA personnel on Manchac, Pearl River and Maurepas Swamp WMAs. A total of 13,373 eggs valued at $267,460 were collected.

Hammond WMA personnel maintained existing WMA boundaries, buildings, equipment, roads and trails. Managed public hunts were also conducted on two WMAs. Combined results for managed deer hunts were 434 hunter efforts with a total of 49 deer harvested.

On Sandy Hollow WMA, 16 miles of bird dog field trial courses were maintained, as well as four dove fields and 10 acres of wildlife openings for upland birds.

Hammond personnel maintained 132 wood duck boxes. Personnel also participated in the statewide mourning dove banding program, responded to numerous deer and nuisance animal complaints, provided technical assistance to the public, conducted public meetings, and collected white-tailed deer brain and lymph node samples across the region for CWD testing. Hammond WMA personnel continued to work with the deer program manager to collect deer reproductive data to better understand deer breeding periods within the ecoregion.

Feral hogs have become a serious nuisance and ecological threat throughout the state. Aggressive control methods have been used on certain WMAs, such as Pearl River, to reduce their numbers. Each year, feral hog blood samples are collected and tested for a variety of diseases.

LAFAYETTE

Wildlife Management Areas (*Total Acres - 189,895 acres*)

- Acadiana Conservation Corridor
- Attakapas
- Elm Hall
- Grassy Lake
- Pomme de Terre
- Richard K. Yancey
- Sherburne
- Spring Bayou
- Thistlethwaite

Habitat types range from mixed pine-hardwoods to backwater bottomland hardwoods interspersed with agricultural lands, and cypress-tupelo swamps to open-water areas. One USFWS refuge (Atchafalaya National Wildlife Refuge) and two USACE properties (Bayou des Ourses and Shatters Bayou) are also managed within the Lafayette region.

Lafayette WMA personnel administer and manage a variety of wildlife-oriented activities. These personnel work in conjunction with and provide technical advice to many different agencies, including USFWS, USACE, Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality, USDA, and local parish entities. Lafayette WMA personnel helped deliver alligator and nuisance animal programs and assisted with program projects such as dove and wood duck banding, as well as deer, woodcock, turkey, black bear and nongame research projects.

The WMAs are maintained and managed to provide outdoor recreation opportunities for all user groups, including both consumptive and non-consumptive. WMA personnel performed a variety of development and maintenance functions such as boundary marking, building maintenance, road maintenance, water control structure operation, moist soil management, beaver and other nuisance animal control, farm contract supervision, equipment maintenance, public user data collection, vegetation control, food plot planting, reforestation, and conducting managed hunts.

A total of 133,299 user days were provided on Lafayette WMAs during FY 2017-2018.

White-tailed deer is the most popular game animal hunted on the Lafayette WMAs. Either-sex deer hunts, with mandatory deer checks were held on the WMAs, with 7,398 user-days recorded and 484 deer harvested. An additional 712 deer were harvested during other either-sex, bucks-only, youth/handicapped, archery and primitive weapons hunts, where self-clearing permits were utilized. Deer hunters totaled 27,190 efforts for the 2017-2018 season. Turkey hunts were held on six WMAs, where 14 turkeys were harvested by an estimated 330 users. This includes seven youth hunters who participated in the Richard K. Yancey, Sherburne, Spring Bayou, Grassy Lake and Pomme de Terre WMAs youth lottery hunts, harvesting one turkey. A member of the National Wild Turkey Federation or Lafayette WMA staff served as a guide for each youth hunter to ensure a quality hunt and to teach youth safe turkey hunting techniques. Squirrel and rabbit hunting is also very popular on the ecoregion's bottomland hardwood WMAs, accounting for over 15,806 user days. Waterfowl hunting is very popular as well on Lafayette WMAs in moist soil impoundments, greentree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 9,122 for this period. Dove fields are maintained, along with many acres of wildlife openings.

Youth lottery deer and duck hunts were also held in Lafayette WMAs, with great success on these hunts. Sixteen youth waterfowl lottery hunters harvested 85 ducks, for an average of 5.3 ducks per youth hunter. Forty-three youth deer lottery hunters harvested 14 deer on 10 hunts. Youth hunters observe many deer on these hunts. The hunts are held in refuge areas set aside for youth hunts, where these youth hunters have a quality hunt and learn about hunting in a safe environment. Seven different Physically Challenged Hunter Permit Wheelchair Hunters on 26 hunts utilized wheelchair-bound waterfowl and deer hunts.

Biologists and technicians maintain and monitor over 500 wood duck boxes, conduct pre-season wood duck banding, and collect samples for CWD, avian influenza and other disease testing. They also assisted with numerous nuisance animal complaints, illegal captive deer and sick deer complaints. Biologists assisted LSU researchers with ongoing research projects.

Alligator applications were reviewed, and licenses and tags were issued to 68 WMA lottery hunters who filled 158 tags. This lottery hunt is done through an application process, with each hunter selected receiving three tags. This gives the public an opportunity to participate in the alligator harvest program. There were also six WMA alligator hunters who bid on tags on the WMAs. These hunters filled 199 tags.

Major projects being initiated or completed included:

- Completion of the RTP project on Grassy Lake WMA.
- Completion of headquarters facilities on Richard K. Yancey WMAs.
- Replacement of water control structures for Sutton Lake and T-Pomme on Pomme de Terre WMA.

Routine maintenance activities on Lafayette region areas included road grading, culvert replacement, road and trail repairs, drainage improvements, beaver control, boundary work, sign replacement, self-clearing station maintenance, vegetation control, equipment maintenance, and facility upkeep. Repairs on all WMA roads and trails were made as funding allocations allowed.

LAKE CHARLES

Wildlife Management Areas
(*Total Acres - 299,995 acres*)

- Clear Creek
- Fort Polk-Vernon
- Marsh Bayou
- Peason Ridge
- Sabine Island
- Walnut Hill
- West Bay

Habitat on these WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods.

There were a total of 36,311 user days for Lake Charles WMAs during FY 2017-2018. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas provide many types of non-consumptive outdoor activities. Managed deer hunts were conducted on several of the WMAs to collect accurate information on herd health and hunter success rates. Collectively, managed deer hunts on Lake Charles WMAs resulted in 5,397 hunter efforts accounting for 734 deer harvested.

Area infrastructure was an important goal during FY 2017-2018 with 215 miles of roadway graded by Lake Charles personnel. In addition, 451 miles of roads and trails were bush hogged on the WMAs; all infrastructure work was conducted as part of the "In-kind Service" agreements between landowners and LDWF as payment for the free leases. Another infrastructure responsibility was the marking of WMA boundary lines with a summation of 90 miles completed for this job activity.

Youth-only lottery turkey hunts were held on Clear Creek, Fort Polk-Vernon/Peason Ridge and West Bay WMAs. The Fort Polk-Vernon/Peason Ridge Lottery Youth Turkey hunt was a guided hunt where selected youths were provided food and transportation to a hunting area predetermined by LDWF. These hunts were intended to get young hunters into the field that may not otherwise have an opportunity to hunt.

Most Lake Charles WMAs were leased to LDWF from private and government entities (Hancock Timber, Roy O. Martin, U.S. Army, USFS, Forest Investments, Calcasieu Parish School Board, Rayonier, Weyerhaeuser, and the State of Louisiana) for public use from the landowners. At present WMA landowners do not receive direct payments for the leases. Instead the owners are compensated through a combination of tax exemptions, road maintenance, mowing, prescribed burning contracts, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet and negotiate annual agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Prescribed burns were conducted on Clear Creek, Marsh Bayou and Peason Ridge WMAs with a total of 1,400 acres burned and 31 miles of firebreaks installed. These burning operations were designed to improve upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, amphibians and small mammals.

Wildlife openings maintained by mechanical control through fallow disking to allow native forbs and grasses to regrow and agricultural planting desirable forage via food plots was 460 acres. Manipulation of certain areas need to kept at an early successional stage for landowner operations as discussed in adopted lease agreements.

Lake Charles Region WMA personnel participated in a variety of Wildlife Division activities. These include environmental assessments, technical assistance, research, planning, development, management, and alligator and nuisance animal programs. Over 52 wood duck nesting boxes were maintained and monitored by Lake Charles WMA personnel. Routine trapping and banding of wood ducks and mourning doves was conducted on WMAs.

Feral hog control operations continued by shooting, trapping on all WMAs. Several WMAs required the removal of nuisance beavers.

Lake Charles WMA staff assisted with a joint (USFS, U.S. Army and LDWF) turkey project on Peason Ridge WMA. A total of 54 birds were trapped and banded. Of that total, 49 hens were fitted with tracking transmitters. The project will continue into the fiscal year as part of an on-going research program.

Personnel also reviewed and monitored oil and gas production activities and interstate pipeline installations on several Lake Charles WMAs. No new oil and gas exploration occurred on state-owned properties.

PINEVILLE

Wildlife Management Areas
(*Total Acres - 98,667 acres*)

- Alexander State Forest
- Camp Beauregard
- Dewey W. Wills
- Elbow Slough
- Little River
- Sabine

Habitat on these WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods.

There were 25,791 actual user days reported for Pineville Region WMAs during FY 2017-2018. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas provide many types of non-consumptive outdoor activities (scouting, hiking, birdwatching, berry picking, nature photography, etc.).

Managed deer hunts were conducted on several of the WMAs to collect accurate information on herd health and hunter success rates. Collectively, managed deer hunts within the Pineville Region WMAs resulted in 1,817 hunter efforts accounting for 338 deer harvested. Biologists collected and submitted 80 blood samples from harvested deer off of WMAs to monitor deer health and disease potential.

In addition to the regular physically challenged hunts scheduled on several of the WMAs, two lottery physically challenged hunts were conducted in the Pineville region: one on Sabine WMA for handicapped citizens and the second on Camp Beauregard WMA for disabled veterans. The Sabine handicapped hunt is conducted in conjunction with the local organization known as HELP (Hunters Enriching the Lives of People). The HELP organization provides all meals, guides hunters and recovers and cleans all harvested game. The Camp Beauregard hunt is conducted in partnership with HELP, a local Combat Veteran's motorcycle club and the Louisiana National Guard. Participating hunters are provided food and lodging. They also are transported to and from hunting areas, have any harvested game retrieved and cleaned, and provided with any needed physical assistance. These hunts are intended to get people into the field that may not

otherwise have an opportunity to hunt. Also, Alexander State Forest WMA has four permanent physically challenged hunting stands for wheelchair-bound hunters. These hunters are given the opportunity to hunt multiple weekends in a restricted access area from LDWF wheelchair-friendly ground stands.

While a few of the WMAs in the Pineville region are owned by LDWF, some of the WMAs are leased to LDWF for public use from the landowners (Hancock Timber, Roy O. Martin, Louisiana National Guard, Louisiana Department of Agriculture and Forestry, USACE, and LaSalle Parish School Board). Landowners do not receive direct payments for the leases. Instead the owners are compensated through a combination of tax exemptions, road maintenance, mowing, prescribed burning contracts, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet and negotiate annual agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Prescribed burns were conducted on Sabine WMA, Little River WMA, and the Woodworth Shooting/Hunter education facility. These burning operations were designed to improve upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, red-cockaded woodpeckers, amphibians, and small mammals. Over 1,000 acres were burned in 2018.

Pineville Region personnel participated in a wide variety of Wildlife Division activities. These include habitat assessments, technical assistance, species research, dove and wood duck banding, wood duck box maintenance and monitoring, feral hog trapping, habitat management (through 1,340 acres of timber management, moist soil management, impoundment flooding, prescribed burns, right of way maintenance, etc.), infrastructure upkeep, disease monitoring, managed and lottery hunts, nuisance animal response, National Hunting and Fishing Day event and other public speaking opportunities, alligator tag management, black bear public education and response, etc.

MONROE

Wildlife Management Areas (*Total Acres - 138,558 acres*)

- Bayou Macon
- Ben Lilly
- Big Colewa Bayou
- Big Lake
- Boeuf
- Buckhorn
- Bussey Brake
- Floy Ward McElroy
- Russell Sage
- J.C. Sonny Gilbert

The primary habitat type found on Monroe Region WMAs is the Mississippi River Alluvial Valley bottomland hardwood forest, with the exception of Sonny J.C. Gilbert, which provides a unique mixed pine upland hardwoods habitat on the fringe of the Mississippi Alluvial Valley. Several of the WMAs feature reclaimed agricultural lands, which have been reforested with bottomland hardwood forest species. Moist soil management units and greentree reservoirs are managed to provide habitat for waterfowl and other wetland birds.

Monroe WMA biologists and technicians conducted a wide range of activities including research and surveys involving mourning doves, wood ducks, wild turkey, coyotes, shorebirds and white-tailed deer. These included collecting CWD and blood samples from deer, disease research in feral swine, as well as waterfowl sampling for disease surveillance. Biologists and area personnel assisted the large carnivore program with bear management activities, including trapping/collaring, den visits, and handled numerous nuisance complaints. Additional effort was expended conducting public meetings, interacting with various

White-tailed deer is the most popular game animal hunted on the Monroe WMAs; 14,165 deer hunter user-days were recorded harvesting 1,423 total deer in the Monroe Region. Turkey hunts were held on four WMAs, where 771 users harvested 20 turkeys. Squirrel and rabbit hunting is also very popular on the ecoregion's bottomland hardwood WMAs, accounting for over 5,194 user days, harvesting 10,597 squirrels. Waterfowl hunting is very popular as well on Monroe WMAs in moist soil impoundments, greentree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 5,315 for this period.

Biologists and technicians maintain and monitor over 220 wood duck boxes, conduct pre-season wood duck banding, and collect samples for avian influenza and other disease testing. They also assisted with numerous nuisance animal complaints, illegal captive deer and sick deer complaints. Biologists assisted LSU researchers with ongoing research projects.

Alligator applications were reviewed, and licenses and tags were issued to 79 WMA lottery hunters who received 193 tags. This lottery hunt is done through an application process, with each hunter selected receiving three tags. This gives the public an opportunity to participate in the alligator harvest program.

Routine maintenance activities on Monroe region areas included road grading, culvert replacement, road and trail repairs, drainage improvements, beaver control, boundary work, sign replacement, self-clearing station maintenance, vegetation control, equipment maintenance, and facility upkeep. Repairs on all WMA roads and trails were made as funding allocations allowed.

Major projects being initiated or completed include:

- Completion of Topan water delivery system
- Completion of Phase 2 Morengo RTP project
- Continued planning process for South Bosco Tract and construction of an ATV/UTV trail for access to the tract.

Private Lands Program

During FY 2017-2018, Private Lands Program biologists conducted 41 site visits. They fielded 1,116 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands Program biologists conducted 112 inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management.

Private Lands Program biologists are also responsible for carrying out activities such as migratory and resident bird surveys and banding, collection of biological data for research, habitat evaluations, disease investigations, nuisance animal response, and administration of the alligator program to over 157 license holders, delivery of the DMAP program to over 206 cooperators, and public outreach via workshops and media outlets.

MINDEN

Minden Office personnel are responsible for administering all wildlife division activities in northwest Louisiana. The following parishes are covered: Bossier, Bienville, Caddo, Claiborne, DeSoto, Jackson, Lincoln, Red River and Webster. Historically the area's predominant habitat type was shortleaf pine-hickory with large areas of bottomland hardwoods along major drainages. Over the last 75 years there have been major changes in land use in upland areas. Shortleaf pine - hickory habitat has been almost completely been replaced by commercial loblolly pine stands with some areas retaining hardwood components in streamside zones. Improved pastures have replaced scattered areas of cropland. As a result, there is currently much less habitat diversity in the current landscape. Acreages that were once longleaf pine have experienced a similar conversion to commercial pine stands. Large tracts of bottomland hardwoods originally found throughout the Red River drainage are non-existent having been converted to agricultural use over the last 200 years. Scattered remnant stands of hardwood are still found in small acreages mostly in very low-lying terrain. The Red River provides primary drainage for the area with the Sabine River draining the western most portion of the region. Numerous bayous and lakes are located throughout northwest Louisiana, which provide additional habitat to a variety of wildlife species. Biologists and technicians assigned to the Minden office are assigned to either the WMA or Private Lands sections. However, they all work on a regular basis in cooperation on projects within both sections.

Wildlife Management Areas (*Total Acres - 45,624 acres*)

- Bayou Pierre - 2,799 acres
- Bodcau - 33,766 acres
- Loggy Bayou - 6,559 acres
- Soda Lake - 2,500 acres

Habitat on these WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods.

A total of 42,854 user days were estimated for Minden WMAs during FY 2017-2018. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas provide many types of non-consumptive outdoor activities. Managed deer hunts were conducted on Bodcau and Loggy Bayou WMAs to collect accurate information on herd health and hunter success rates. Collectively, managed deer hunts on Minden WMAs resulted in 631 hunter efforts accounting for 168 deer harvested.

Most of the Minden WMA acreage is owned by other governmental agencies. LDWF is the sole owner of Bayou Pierre WMA and owns 65 percent of Loggy Bayou WMA. USACE, Red River Waterways Commission, Caddo Parish Levee Board and Louisa State Lands Office all provide acreage to the Minden WMA program. At present landowners do not receive direct payments for the leases. Instead the owners are compensated through a combination of road maintenance, mowing, prescribed burning projects, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet with and negotiate lease agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Prescribed burns designed to improve upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, amphibians and small mammals were conducted on Bodcau WMA.

Routine trapping and banding of wood ducks and woodcock was conducted on WMAs.

Dove fields were planted and maintained on Bayou Pierre, Bodcau and Loggy Bayou WMAs. Plans were made to establish new dove fields on acreage expected to be added to Soda Lake WMA.

All Minden WMAs have at least one waterfowl impoundment with a total of seven actively managed. Management activities include regulation of water levels, control of nuisance vegetation, mowing and discing to promote desirable vegetation, maintaining nest boxes, and monitoring of waterfowl activity.

Feral hog control operations continued by shooting, trapping and contract aerial shooting on all WMAs. Trapping activities resulted in the removal of 355 hogs and an estimated 160 were taken through shooting efforts. Nuisance animal control activities also included the removal of beavers and coyotes.

Minden WMA personnel participated in a variety of Wildlife Division activities. These include environmental assessments, technical assistance, research, planning, development, management, and alligator and nuisance animal programs. Forty-seven wood duck nesting boxes were maintained and monitored by Minden WMA personnel.

Personnel also reviewed and monitored oil and gas production activities and interstate pipeline installations on Minden WMAs. No new oil and gas exploration occurred on state-owned properties.

Private Lands Program

The Private Lands Program provides assistance to landowners, land managers, hunting clubs and others who desire to improve habitat and/or manage wildlife on their property. Assistance can vary from answering simple questions to a comprehensive written management plan. Assistance is not only available for traditional game species such as deer, ducks and turkey, but includes all wildlife and their habitats.

Many landowners are already working with a natural resource professional, such as a consulting forester, or are enrolled in state or federal programs such as DMAP, Forest Stewardship and/or USDA-NRCS programs such as the Wetland Reserve Easements, Conservation Reserve Program or Environmental Quality Incentives Program. Minden Private Lands biologists cooperate with other natural resource professionals to achieve the landowner's objectives. Most importantly, landowners are encouraged to develop a cooperative relationship with LDWF Private Lands biologists and other natural resource professionals. Wildlife habitat is dynamic, and with the assistance of knowledgeable wildlife professionals, landowners can provide productive habitat for wildlife while meeting other goals they may have, such as income generation and optimizing recreational opportunity.

During FY 2017-2018, Minden Private Lands biologists conducted 37 site visits and delivered 11 written habitat management plans. They fielded 1,064 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands biologists conducted six inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management. Minden biologists and technicians monitored and maintained 54 wood duck boxes on USFS property.

Minden Private Lands biologists are also responsible for carrying out activities such as

migratory and resident bird surveys and banding, collection of biological data for research, habitat evaluations, disease investigations, nuisance animal response, administration of the alligator program to 96 license holders, delivery of the DMAP program to 77 cooperators, and public outreach via workshops and media outlets.

FARM BILL/GRANTS PROGRAM

FARM BILL

The Farm Bill Program provides support for many species management programs and the Private Lands Program within LDWF. A primary function of the program is to provide input on conservation and other programs contained within the Farm Bill at the national, state and local level to enhance wildlife habitat. During FY 2017-2018, the program provided direct input on many conservation programs, such as the Agricultural Conservation Easement Program, Conservation Reserve Program, Environmental Quality Incentives Program, Regional Conservation Partnership Program, Conservation Stewardship Program, and Working Lands for Wildlife Program included in the Agricultural Act of 2014. In addition, the program provided training for Private Lands Program staff and developed recommendations on individual properties to facilitate enrollment into Farm Bill conservation programs. The Farm Bill Program continued implementation of an agreement with the USDA-NRCS to provide technical assistance for the Wetland Reserve Program and Agricultural Conservation Easement Program. This agreement provides funding to develop wildlife habitat management recommendations in response to Compatible Use Authorization requests on Wetland Reserve Program/ Agricultural Conservation Easement Program easements in Louisiana, which currently total approximately 300,000 acres. Additional accomplishments in FY 2017-2018 included implementation of a Working Lands for Wildlife Program that will directly benefit the Endangered Species List Candidate - Louisiana pine snake, and a suite of shorebird species that are of conservation concern. Participation will provide regulatory assurance for non-industrial private landowners that manage properties on suitable sites for the Louisiana pine snake. In other aspects of the program staff worked with agricultural producers to provide shallow-water habitats during late summer and early fall on 7,000 acres of cropland, when water is typically scarce across our state. LDWF staff efforts related to the Conservation Stewardship Program moved from program "reinvention" to delivery. The Conservation Stewardship Program rewards the good stewardship of private landowners while compensating them for habitat enhancements that will move them to the next level of conservation on their lands. New projects were initiated for forest landowners to be rewarded for the installation of wildlife habitat enhancements. Staff along with partners from across the country continued to give input to shape policy that will be go in to the 2018 Farm Bill. These activities help ensure that items within that legislation are applicable to cropland, pasture and forestland in Louisiana.

GRANTS

During FY 2017-2018, two State Wildlife Grants were administered under this program with assistance from the Private Lands Program. Both the East Gulf Coastal Plain and West Gulf Coastal Plain Prescribed Burn Initiatives provided funding to enhance wildlife habitat on privately-owned forestlands in Louisiana. Cumulatively these initiatives funded prescribed burning activities on 591 acres during FY 2017-2018. These activities will continue during the current fiscal year as efforts were successful in procurement of additional State Wildlife Grant funding to continue the program. In addition, the program continued delivery of a National Fish and Wildlife Foundation grant, secured to fund prescribed burning on 7,000 acres of privately owned forestlands in central Louisiana. Partners completed burning operations on 1,952 acres with funding from this effort.

COASTAL & NONGAME RESOURCES

ROCKEFELLER WILDLIFE REFUGE

Rockefeller Wildlife Refuge (RWR), located in coastal Cameron and Vermilion parishes, was created in 1920 through a land donation developed by E.A. McIlhenny. He later persuaded the Rockefeller Foundation to deed the land to the State of Louisiana. Along with serving as a refuge for wildlife and fisheries species, RWR is also considered an "outdoor laboratory," with the property serving as a site for marsh-related research pursued by RWR staff, collaborators and governmental and academic researchers. RWR staff also provides professional expertise regarding the sustainable use of alligators, management of coastal wetlands and other important wildlife and fisheries resources. Further, management expertise, technical assistance and guidance is provided by RWR staff to local landowners for the wise use of their marshland. Lastly, RWR serves as a recreational outlet for the local populace, as well as a destination for regional tourists.

Based on the original deed of donation, the primary goal of RWR is to provide a refuge and preserve for all wildlife and fisheries species. Therefore, management activities are used to promote appropriate habitat and conditions for waterfowl species (the original intent of E.A. McIlhenny for the property), establish/maintain historic flora and fauna of RWR, and maintain the hydrology of the Mermentau River Basin. In many cases, refuge management activities positively benefit other marsh inhabitants including shorebirds, wading birds, alligators, furbearers and estuarine organisms (i.e., fish, shrimp and crabs).

Another main goal is to study wildlife, fisheries and wetlands in order to address pertinent ecological research questions and to disseminate findings to local, state, national and international audiences. Since 1955, RWR staff has published 350+ peer-reviewed manuscripts, while also preparing technical reports and contributed papers to professional conferences. Secondary goals include providing technical assistance and public outreach and providing a popular destination for recreational activity, primarily through the use of abundant fisheries resources (i.e., fishing, shrimping, crabbing) and the diversity of watchable wildlife (i.e., birdwatchers); it should be noted that these two activities never supersede the main goals of RWR.

CONSTRUCTION/ REPAIRS

RWR personnel and administrators continue to work with FEMA to expedite post hurricanes Rita and Ike construction projects. One of the remaining FEMA projects is Phase III levee repair project, which has been held up because of legal matters pertaining to the bid documents submitted by contractors. The project is awaiting a decision from the courts. The maintenance and construction staff continues to clean ditches and maintain levees throughout the marsh on RWR. This

Unit 4 Water Control Structure, half way through construction on June 14, 2018.

annual practice maintains the refuge's levee system comprised of over 200 miles.

Additional funds were approved in FY 2014-2015 to construct the new laboratory and grow-out facility near the storm platform. The project was awarded to Alfred Palma Construction on Dec. 21, 2016 for $6,159,000. Construction began in FY 2016-2017 and continued in FY 2017-2018.

The North and East Levee refurbishment was approved as a Capital Outlay Project. The project was designed by Royal Engineers and was awarded to LeBlanc Marine, LLC. for $2,747,342. Work began in FY 2016-2017. This includes Units 1, 8, 10 and 13 and the Price Lake Unit. The project was completed in FY 2017-2018.

Plans for the West End Dorm were completed FY 2014-2015 and the bid for the construction of West End Dorm was awarded to Trahan Construction for $2,413,000. This FEMA project is to replace the original West End Dorm ruined in 2005 by Hurricane Rita. Completion and acceptance of the dorm was issued Oct. 9, 2017.

The Rockefeller Jetty Project was approved as a capital outlay project and was in the design phase in FY 2016-2017. The jetty project will maintain Joseph Harbor's outlet to the Gulf of Mexico for drainage and navigation, as well as assisting with collecting sediments on the eastern shoreline of the outlet. Proper coastal use permits were obtained during FY 2017-2018. The project is estimated to be out for bidding in FY 2018-2019.

The partnership with Ducks Unlimited continued in FY 2017-2018 with the development of the prototype water control structure for Unit 4. This project was funded through NAWCA for $1 million. Construction began in FY 2017-2018. Additional money from sponsors and LDWF, paid for the construction of fishing piers behind the new water control structure. This provides a safe and enhanced recreational opportunity for the public.

MINERAL MANAGEMENT

Beginning in October 2011, Chevron began rig setup and exploration for an ultra deep gas venture known as Lineham Creek in the northwestern corner of RWR. Due to mounting costs and several failed attempts, drilling stopped at about 24,500 feet; the rig was demobilized and off site by June 2014. Following the price reduction in oil/natural gas in FY 2014-2015, Chevron plugged and abandoned the site in FY 2015-2016. Remediation of the well site began November 2017 and was completely remediated as specified by LDWF in January 2018.

The only active oil production taking place on the refuge is Hilcorp Oil Company. The program manager and staff continues to work with Hilcorp regarding maintenance and safe operations on RWR.

Multiple pipeline proposals have been proposed for removal and abandon in place in FY 2017-2018. Permit drawings have been produced for each project for review with clearance authorization letters being issued from LDWF. These projects are being scheduled within the upcoming fiscal year.

MARSH, WILDLIFE AND FISHERIES MANAGEMENT

MARSH MANAGEMENT

RWR staff maintains over 200 miles of levees and 55 water control structures for the conservation of approximately 71,000 wetland acres on RWR and 100,000 private sector acres within the Mermentau River Basin. Maintenance and manipulation of RWR's system of levees and water control structures vary somewhat by management unit, but general goals are to maintain marsh health, provide conditions favorable for waterfowl forage, and incorporate multi-species management when possible. Biological staff uses the approved RWR management plan, which acts as a tool to guide research and management on the property.

Habitat conditions have become more stable, with many water control structures replaced (or planned to be replaced) for management of water levels throughout RWR. Furthermore, staff have also worked on wetland permit applications with USACE and the LDNR - Coastal Management Division for levee restoration and maintenance. Hydrologic restoration and unit management have improved as a result of completion of FEMA projects, including the completion of ditch maintenance in Units 1, 2 and 14. In addition to water control, staff performed vegetation control with herbicides via airboat to help improve habitat in Units 6, 9, 10 and 13. Aerial applications were also conducted to assist with vegetation control in Unit 8. Approximately 600 acres were treated on the refuge.

Unit 9 (about 90 acres) is used as the second release site for whooping cranes in southwestern Louisiana. Staff completed a prescribed burn in February 2015 and later completed herbicide applications of the unit in May 2015. Staff also installed a water control unit on the east end of Unit 9, completed FY 2015-2016. By June 2016, the unit was complete with functioning levees and pumps. Staff continues to manage habitat conditions in Unit 9 specifically for the continue introduction of whooping cranes.

Marsh fires during the right time of the year decrease fuel loads of marsh vegetation, prevent catastrophic fires when the marsh is excessively dry during the summer, and also provide new stem growth for migratory waterfowl species. Generally, one-third of the refuge is burned on a yearly basis.

Refuge staff continued monitoring giant salvinia and feral hogs. Salvinia continues to be managed on the refuge via the use of higher levels of salinity that are introduced by opening the East End Locks and by cooperatively working with the LSU AgCenter with the weevil eradication control project. Efforts continue in FY 2017-2018 to monitor the status of these two invasive species on RWR.

The recent discovery of the roseau cane scale in southeastern Louisiana deltas has initiated the development of research projects to understand the possibly effects of the roseau cane scale. Discovery of large die-offs of roseau cane stands are occurring in the southeastern portion of the Mississippi River Delta. It is considered vital species of vegetation in areas to prevent land loss. Collections of two healthy stands of roseau cane occurred on RWR of the Gulf variety and the Delta variety. The samples will be used for experiments performed in collaboration with USDA-NRCS, LSU, and the Louisiana Department of Agriculture and Forestry.

Marsh Creation and Habitat Enhancement with Beneficial Use of Dredge Material

LDWF entered into an agreement with USACE and other regulatory agencies to construct the Rockefeller Mitigation Bank to offset wetland losses caused by adverse impacts in Louisiana's Coastal Zone. The major objective of the mitigation bank is to compensate for impacts occurring on RWR or for impacts outside the refuge (provided there are no available approved mitigation projects).

LDWF originally permitted three areas on RWR as potential wetland mitigation sites in year 2000 (totaling 177.7 acres). Staff continues to monitor these sites annually, with very successful grass plantings observed at the 4.7-acre and 66-acre sites. Consequently, these marsh creation projects have attracted fisheries species, a diversity of birds and even muskrats.

A release of credits is due for the acceptance acres within the 4.7-acre and 66-acre sites. The 107-acre site is in design for additional pumping of spoil in areas that have settled lower than expected since the original construction in 2014. The 107-acre permit has to be renewed prior to construction for FY 2017-2018.

Shoreline Protection and Stabilization

The shoreline along RWR's 26 miles of beach typically erodes at approximately 30-50 feet per year. We have seen a steady increase in the erosion rate, new surveys conducted on the Price Lake Unit Shoreline discovered that the coastline eroded 233 feet in nine months. There have also been large "washouts" that blast into the natural beach ridge allowing a small channel of Gulf water to flow in and affect healthy marsh.

In FY 2015-2016 RWR was successful with being awarded $33 million from the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) on Dec. 10, 2015. This project calls for shoreline protection along a portion of RWR coastline in the form of segmented breakwaters. The project has been designed and was awarded to the lowest bidder, Leblanc Marine, in FY 2016-2017. Construction is scheduled to begin in August of FY 2018-2019.

With the project bidding coming in under budget, approximately $8 million of allocated funds still remain. A proposed change order to use the remaining funds to extend the project is being considered by CWPPRA committee members and is supported by the Coastal Protection and Restoration Authority (CPRA). The additional funds will possibly extend shoreline protection approximately 1 mile further from 2.8 miles base bid section.

Another funding source dedicated to shoreline protection along RWR is the CPRA parish match grant money awarded to Cameron Parish Police Jury in the amount of $6.67 million. The Cameron Parish Police Jury used $3 million of Community Development Block Grant money as match offering a total of

LEFT: *A line of airboats get ready to tour Rockefeller Wildlife Refuge. For the week of May 22-25, 2018, marsh managers from all coasts of the United States met for a week-long workshop on coastal wetlands and future sea level rise.* ***RIGHT:*** *Joseph Harbor Outlet to the Gulf of Mexico. This image was taken in the summer of 2018, a few weeks prior to construction of the CWPPRA Coastal Restoration Project, ME-18 Gulf Shoreline Stabilization Project.*

***ABOVE:** Refuge staff and summer interns work on seining one of the bass ponds at Rockefeller, May 16, 2018. **BELOW:** Bass fingerling.*

$9.67 million towards shoreline protection at RWR. It is estimated this portion of construction funds won't begin construction until FY 2018-2019.

WILDLIFE MANAGEMENT

Alligator Nuisance Harvest

An experimental nuisance alligator harvest is normally conducted on RWR during September by nine Rockefeller alligator hunters (with 40 tags each). The harvest was done by alligator hunters with a prior trapping history on RWR, as well as two hunters selected via a lottery system; all were approved by LDWF after successful completion of an enforcement background check. Hunting areas were distributed throughout RWR with the intent of taking alligators from areas with high public use, thus reducing the chance of negative interactions between alligators and humans. The experimental nuisance alligator harvest did not occur in FY 2017-2018 due to lack of interest from processors in purchasing the harvested alligators. There was not a marketable value in the meat and skin markets.

FISHERIES MANAGEMENT

RWR continued an active approach with the operations of water control structures across the refuge. This permits the ingress and egress of estuarine marine organisms into and out of the marsh without impacting established habitats on RWR and adjacent landowners.

Staff continued efforts in stocking Florida-strain largemouth bass (*Micropterus salmoides v. floridanus*) to supplement populations lost on the refuge due to hurricane impacts and extreme drought conditions; these efforts also improve recreational opportunities for the species on RWR. In the summer of 2018, the rearing ponds at RWR were stocked with 283,200 fry, and later seining of these ponds resulted in approximately 125,714 fingerlings (44 percent survival rate). The Florida-strain largemouth bass fingerlings were stocked on RWR in May 2018 and a portion of the fingerling were dispersed with the help LDWF Inland Fisheries Division. We hope to continue this cooperative effort to assist Inland Fisheries with their target stocking goals.

WATERFOWL/ MIGRATORY GAME BIRD PROGRAM

In 1994, RWR began a long-term mottled duck (*Anas fulvigula*) banding program to monitor annual survival rates and analyze distribution along the Gulf Coast between Texas and Louisiana. The banding effort is now a cooperative effort with Texas and Louisiana and involves many state and federal biologists, technicians and student workers. Some of the early analysis of data has shown high variability in survival rates with some mortality attributed to hunting.

Since 1994, the Coastal and Nongame Resources staff have banded 44,297 mottled ducks. Coastal and Nongame Resources biologists completed the 24th year of the program by banding 2,203 mottled ducks statewide, primarily at RWR. Along with the 2,203 mottled ducks banded, there were 106 recaptures.

Black-bellied whistling ducks (*Dendrocygna autumnalis*) have greatly expanded their range since the mid-1990s to include southern Louisiana and recently as far east as the Carolinas. Black-bellied whistling duck banding efforts have been ongoing in Louisiana since 2010 in collaboration with LDWF Waterfowl Biologist Paul Link. During the spring of 2018, refuge biologists banded a total of 478 individuals at three sites in southwestern Louisiana. These same sites recaptured 294 whistling ducks.

Winter aerial waterfowl surveys are conducted annually over Coastal and Nongame Resources areas in south Louisiana on a monthly basis from November through January. Transects are flown in each management unit and the unmanaged marsh area, and thereafter, extrapolated to yield an estimate of waterfowl abundance on the area. The mean waterfowl survey estimate on RWR during 2017-2018 was approximately 141,376 ducks per survey. This is 72 percent increase from the 2016-2017 average (82,006). We anticipate that ongoing marsh management activities will continue to improve waterfowl counts in the upcoming years.

In May 2017 a staff biologist served as the observer on the spring breeding population and habitat aerial waterfowl survey in the northern Saskatchewan and Manitoba or bush crew area. This survey is conducted each spring by the USFWS Migratory Bird

LEFT: *LDWF plane on a flight survey over Rockefeller Wildlife Refuge, Nov. 7, 2017. Flight Surveys are conducted annually throughout the state.*
RIGHT: *Biologist James Whitaker before he goes flying on a survey.*

Program, state wildlife agencies and the Canadian Wildlife Service to estimate the size of breeding waterfowl populations across North America and to evaluate habitat conditions on the breeding grounds. These surveys are conducted using airplanes, helicopters and ground crews, and covers over 2 million square miles that encompass the principal breeding areas of many species of waterfowl in North America. The traditional survey area comprises parts of Alaska, Canada and the north-central United States, and covers approximately 1.3 million square miles. The eastern survey area includes parts of Ontario, Quebec, Labrador, Newfoundland, Nova Scotia, Prince Edward Island, New Brunswick, New York and Maine, covering an area of approximately 0.7 million square miles. The traditional survey area has been flown annually since 1955 to obtain estimates of duck abundance. In addition, in the prairies, parklands and boreal forest regions, habitat conditions are recorded using an index of the number of ponds observed by the airplane crews. This survey is the longest running most scientifically robust wildlife survey in the world and is used to set waterfowl season frameworks throughout North America. The 2017 results indicated 47.3 million breeding ducks in the traditional survey area which is similar to last year's estimate of 48.4 million and is 34 percent above the 1955-2016 long-term average. The total pond estimate for the United States and Canada combined was 6.1 million, which is 22 percent above the 2016 estimate of 5 million and 17 percent above the long-term average of 5.2 million.

RWR staff participated in the state-wide dove banding efforts, banding 147 mourning doves (*Zenaida macroura*) and 309 recaptures. This information helps with population estimates, annual survivorship estimates and bird distribution/movements. Bait preference has been studied in this past year with trap locations on RWR.

A staff biologist served as an observer on the fall inventory of the Mid-Continent Greater White-fronted Goose survey in Saskatchewan and Alberta. This survey is flown in late September and early October in southern Saskatchewan and Alberta to determine annual abundance of Greater White-fronted Geese. This survey provides critical information that aids with population estimates, habitat utilization and annual survivorship; all of which aids in regulating bag limits. A total of 771,609 greater white-fronted geese were estimated during the 2017 survey, a 23 percent decrease from 2016 (1,000,132).

A staff biologist continues to coordinate and work cooperatively with USFWS on the mid-winter goose survey for the state of Louisiana. The mid-winter goose survey is a nationwide effort to survey geese in areas of major concentrations on their wintering grounds and provide winter distribution and habitat affiliations. This survey also serves as a primary source of data on population trends for some species that breed in remote areas of the Arctic, where traditional methods of surveying are hard to achieve.

A RWR biologist also participated in the Mottled Duck Spring Breeding-Population Survey in coastal Louisiana. This survey is conducted annually each spring in coastal Louisiana and Texas to monitor the western Gulf Coast population of mottled ducks. A staff biologist continues to work with LDWF Waterfowl Program cooperatively on multiple projects including blue-winged teal avian influenza testing, snow goose avian influenza testing and movement ecology, greater white-fronted goose movement ecology, lesser scaup annual survivorship and black-bellied whistling duck movement ecology.

WHOOPING CRANES

The Louisiana non-migratory whooping crane (*Grus Americana*) population continued to grow in 2017 due to the second largest shipment of captive-reared juvenile cranes received since the reintroduction project began. In November, 23 juveniles were received from the International Crane Foundation and the Freeport-McMoRan Audubon Species Survival Center located in New Orleans. In addition, we received seven chicks from the USGS Patuxent Wildlife Research Center and two from the Calgary Zoo to socialize into a cohesive cohort. The cohort of 11 from the International Crane Foundation was initially housed and released at a temporary pen located at the White Lake Wetlands Conservation Area in Vermilion Parish, while the cohort of 12 from Audubon was housed and released at RWR in Cameron Parish.

The maximum size of the Louisiana non-migratory population at the end of the report period was 63 individuals (n = 31 males and n = 32 females), with 50 birds in Louisiana and 13 outside of the state. Based on location data generated via remote transmitters, we documented cranes in 18 parishes throughout Louisiana as well as nine different states, one Canadian province and one Mexican state. Two cranes alone account for all points located in the states of Alabama, Florida, Kansas, Mississippi, Montana, Nebraska and Oklahoma as well as the international points. The remaining data points mainly represent short, exploratory trips typically made by young cranes into neighboring states; however, cranes from multiple cohorts have spent considerable amounts of time in southeast Texas where habitats are similar to those in southwest Louisiana. Fortunately, our partners with other state and federal agencies work closely with us to document such occurrences and provide updates on the status of cranes in their vicinity.

During the 2018 breeding season, nine nesting pairs initiated 13 nests. Although this is only an increase of one nesting pair compared to the previous year's total, it is important to note that three of the pairs that nested in 2017 were lost due to the death of one member. Four new pairs formed early in 2018 and nested for the first time along with the five surviving pairs that nested in previous years. In late April and early May, five chicks hatched to four pairs, the most to hatch since Louisiana whooping cranes began breeding in 2014. Three of these chicks hatched to their biological parents, including one to a pair where the male was only two years old. The remaining two chicks were the result of swapping a hatching captive egg or newly hatched chick into the nests of two pairs of Louisiana whooping cranes, neither of which had prior parenting experience. Due to the high number of infertile eggs and significant embryo mortality we have observed, we began submitting adult blood and egg content samples for toxicology screening, but thus far nothing of concern has been detected. In addition, we deployed data-logger eggs in four nests to gather nest environment and incubation data. We will continue with these new research initiatives to learn more about factors that influence reproductive success, and use that knowledge to increase the productivity of Louisiana whooping cranes.

LDWF continues to educate the public about the Whooping Crane Reintroduction Program through a variety of means. Public outreach efforts consisted of staff participating in festivals and outreach events around the state where literature and other information were disseminated to the public. Staff also presented information on the reintroduction effort to various clubs and organizations throughout the year.

Our media campaign continued to focus on raising public awareness regarding both positive and negative aspects of the program, including re-emphasizing the issue around illegal shootings involving whooping cranes which accounts for an alarming 33 percent of the confirmed or suspected mortality in the population where a cause of death could be determined. The media plan once again utilized an assortment of methods including billboards, newspaper, magazine and digital ads.

Now in its eighth year, the Louisiana Whooping Crane Reintroduction Program has made much positive progress, and we are determined to continue making strides towards our ultimate goal of establishing a self-sustaining population in the state.

The Whooping Crane Program is supported by multiple funding cooperators including Rockefeller Trust Funds, USFWS, State Wildlife Grants, the Coypu Foundation, and corporate partners Chevron and Cameron LNG.

WILDLIFE AND FISHERIES RESEARCH

RWR places high priority on wildlife, fisheries and marsh management research. Throughout the year, staff biologists conducted independent and collaborative research, while also presenting research findings at regional, national and international meetings. Several notes or manuscripts describing research results or observations were also accepted for publication in peer-reviewed journals.

Outside researchers made multiple research requests and all were approved to use RWR as a study site. Projects included using light-level geolocators to measure breeding propensity of mottled ducks (*Anas fulvigula*) in the Western Gulf Coast (Gulf Coast Joint Venture), sampling for saltmarsh topminnow (*Fundulus jenkinsi*; USFWS), black rail (*Laterallus jamaicensis*) surveys (Audubon Louisiana), an investigation of migration stopover ecology of the semipalmated sandpiper (*Calidris pusilla*) in the Northern Gulf of Mexico (Tulane University), and monitoring nesting productivity of beach nesting birds (Audubon Louisiana).

STAFF RESEARCH AT RWR

Nesting Ecology and Habitat Use of Reddish Egrets

Research focused on the distribution, abundance and nesting ecology of reddish egrets (*Egretta rufescens*) was initiated in the spring of 2016. Staff continued to monitor the 16 birds outfitted with satellite transmitters on Rabbit Island to provide information on movement patterns, habitat use and survival. In the fall of 2016, four birds migrated outside of Louisiana. Wintering locations outside of Louisiana included Nicaragua, Guatemala and one area in Texas (Matagorda Island WMA/ Aranasas National Wildlife Refuge). All transmitted birds returned to Rabbit Island for the breeding season, although one mortality did occur during the reporting period. During the 2018 nesting season (March-June), staff monitored 27 nests on Rabbit Island in southwestern Louisiana. RWR staff continued efforts to deploy satellite transmitters on adults and deployed an additional nine transmitters on birds captured at three nesting locations in southeastern Louisiana (Raccoon Island, Queen Bess and Brandy Island). A total of 15 adults and 56 chicks were banded during the 2018 season with blood samples submitted for genetic analyses at Texas Tech University. To better understand foraging habitat selection and suitability for these birds, staff compiled data on habitat measurements and prey samples at "use" points and "random" points using satellite transmitter data, as well as "observation" points where birds without transmitters were observed. The project was funded through Louisiana State Wildlife Grants Program and RWR.

Value of Chenier Stopover Habitat to Nearctic-Neotropical Migratory Birds

Research was initiated in the spring of 2018 to investigate the value of chenier as stopover habitat to neartic-neotropical migratory birds. Data collected from stations will contribute to over 20 years of spring migration data in southwestern Louisiana coastal cheniers, assist collaborative researchers with projects investigating weather radar data and parasite load research questions. Preliminary work was conducted in spring 2016 to assess suitability of Nunez Woods as a research site for spring migration research. Sites located at Nunez Woods and Hollister Woods properties were established for spring migration research. Crews stationed at migration station collectively banded 4,852 new birds at the two sites. Nanotags were deployed on focal species to further investigate stopover

duration, body condition and pace of migration to northern breeding grounds. For the 2018 season, 31 Swainson's thrush and nine northern waterthrush were outfitted with nanotag units. Crews In addition collected data investigating resource availability as well as avian presence during the field season (March-May). The project funded through Rockefeller Wildlife Refuge and the University of Southern Mississippi.

Monitoring Species of Greatest Conservation Need Nesting on Shell Islands in Southwestern Louisiana

Research was initiated in the spring of 2015 to determine the abundance and distribution of the American oystercatcher (*Haematopus palliatus*) in southwestern Louisiana, as it was considered a species of greatest conservation need (SGCN, S1). Since 2015, few pairs have been observed within the region, likely due to limited suitable nesting areas. However, many other SGCN have been observed utilizing nesting areas where American oystercatchers were located. RWR staff initiated monitoring efforts to determine site selection and nest success of avian species within these sensitive nesting areas. During the spring of 2018, staff monitored six nests from four pairs of American oystercatchers nesting in Cameron and Vermilion parishes. Three nests successfully hatched chicks, and two nests had at least one chick survive to fledge. Staff also monitored five seabird species nesting on six shell islands near Vermilion Bay that were adjacent to or located on the same islands as oystercatchers. Three of the six islands where breeding pairs were observed were successful in hatching chicks for some of these species. The project was funded through Rockefeller Wildlife Refuge.

Abundance and Habitat Use of Resident and Wintering Loggerhead Shrikes in Southwestern Louisiana

RWR staff initiated winter transect surveys along Highway 82 (primarily marsh habitat) and Highway 14 (primarily agricultural habitat) in December 2014 as an effort to contribute to counts for the Hawk Migration Association of America and track trends of raptors selecting wintering habitat within the region. Loggerhead shrike (*Lanius ludovicianus*) numbers and locations were included in surveys conducted as a part of this effort. Staff initiated surveys for resident birds during the summer of 2016 to compliment what was observed during winter surveys to provide additional information on year-round abundance, distribution and changes in available habitat over time (Louisiana Wildlife Action Plan priority). Habitat was classified along transects and surveys were conducted monthly during winter (December-February) and summer (June-August). The project was funded through Rockefeller Wildlife Refuge.

Blood Lead Concentrations in Mottled Ducks in the Louisiana Chenier Plain

During July and August 2017, staff collected blood samples from molting mottled ducks to investigate blood lead concentrations during the molt period of the annual cycle. A total of 128 blood samples were collected and analyzed during the molting period. Preliminary results indicated that approximately 13 percent of mottled ducks sampled contained elevated blood Pb levels (>200ppb). No differences in Pb concentrations were detected between age and sex of birds, and little variance was explained by weight of the bird at capture. Stable isotope analyses indicated that the Pb found in mottled duck blood was likely a result of ingested lead shotshell pellets. The project was funded through Rockefeller Wildlife Refuge.

A Survey of Waterbird and Waterfowl Nests Found on Terraces Constructed in Price Lake Unit

During the spring and summer of 2018, staff and student interns conducted surveys on marsh terraces within Price Lake and Unit 6 of RWR to determine habitat suitability and nest site selection by waterbirds and waterfowl. Surveys were conducted on foot and nests were located by visual encounter as well as by physically disturbing vegetation causing nesting birds to flush. Five species of birds were found nesting on the terraces: black-bellied whistling-duck (*Dendrocygna autumnalis*; n = 4 nests), Canada goose (*Branta canadensis*; n = 4 nests), fulvous whistling-duck (*Dendrocygna bicolor*; n = 3 nests), mottled duck (*Anas fulvigula*; n = 3 nests), and green heron (*Butorides virescens*; n = 1 nests). Results from the study indicated that marsh terraces were utilized by mottled ducks, a non-migratory waterfowl species of conservation concern found in the western Gulf Coast, as well as cavity-nesting birds such as black-bellied whistling-ducks. The ability of marsh terraces to provide suitable nesting habitat for birds one to two years after construction demonstrates the immediate impact they can have on marsh ecosystems. This study is ongoing and will be continued in coming years. The project was funded through Rockefeller Wildlife Refuge.

An Investigation of Moist-soil Seed Production in the Rockefeller Wildlife Refuge Goose Pastures

During the fall of 2017, plant samples were collected from the RWR goose pastures and sent to the University of Tennessee - Knoxville for moist-soil seed biomass analyses. Results indicated that the pastures contained minimal seed biomass and could support less than 500 waterfowl for 100 days. During the spring and summer of 2018, pastures were actively managed to promote the growth of moist-soil vegetation. Preliminary observations indicated management actions such as delayed drawdowns, disking and roller chopping were beneficial and promoted an increase in moist-soil plant growth. Seed biomass samples will be collected during September 2018 to quantify seed biomass. This is an ongoing study which will be continued in coming years. The project was funded through Rockefeller Wildlife Refuge.

Evaluating Nest Box Use of Black-Bellied Whistling-Duck (*Dendrocygna autumnalis*) in Southwest Louisiana

In 2015, nest boxes were deployed on RWR and on private property in Pecan Island, Louisiana in an attempt to provide nesting habitat for black-bellied whistling-ducks. Starting in April 2018, staff and student interns monitored nest boxes to determine use and nest success. Nests were initiated in 68 percent (n = 13) and 61 percent (n = 11) of nest boxes on RWR and Pecan Island, respectively. Overall utilization was 65 percent (n = 24/27). Clutch size ranged from 12-31 eggs, and averaged 18 eggs per nest. Seven boxes hosted multiple clutches; two at RWR and five at Pecan Island. Thirty-two percent of nests were successful and 19 percent were abandoned. Within successful nests, 85 percent (156/184) of eggs hatched. This study is ongoing and will be continued in coming years. The project was funded through Rockefeller Wildlife Refuge.

Coastal Plant Communities on Rockefeller Wildlife Refuge

During the summer of 2018, student interns developed a detailed vegetative map outlining plant communities on RWR. Interns conducted transect surveys (n = 360) within 13 of the 15 management units on RWR. Each transect was 900 feet (304 m) long and consisted of 10, 1-m^2 plots. Interns recorded each plant species and its respective stem count and percent cover for each plot.

Preliminary results indicated that Olney bulrush (*Schoenoplectus californicus*), duckweed (*Lemna minor*) and bulltongue arrowhead (*Sagittaria lancifolia*) were most common in intermediate marsh (5-10 ppt), saltmeadow cordgrass (*Spartina patens*), coastal saltgrass (*Distichlis spicata*) and leafy three-square (*Schoenoplectus robustus*) were found most commonly in brackish marsh (10-20 ppt), while saltwort (*Batis maritima*) and smooth cordgrass (*Spartina alterniflora*) dominated salt marsh (>20 ppt). Managed areas of the refuge were dominated by leafy three-square and saltmeadow cordgrass, while saltmeadow cordgrass and smooth cordgrass dominated unmanaged areas of the refuge. Continued monitoring efforts will assist conservation planners in evaluating previous management actions and while also helping to improve future management on RWR. The project was funded through Rockefeller Wildlife Refuge.

COLLABORATIVE RESEARCH AT ROCKEFELLER WILDLIFE REFUGE

During FY 2017-2018, RWR biologists collaborated on a number of marsh management, wildlife and fisheries research projects on the refuge, across the region and state, and beyond. These projects include:

- **Nest site selection and nest success of avian SGCN on colonial nesting bird islands in southwestern Louisiana.** S. Collins with S. King and K. Ritenour, LSU (funded by LSU and Rockefeller Operating Funds)
- **Mottled duck breeding ecology in southwest Louisiana.** J. Marty and S. Collins with K. Ringelman and L. Bonczek, LSU (funded by Rockefeller Operating Funds, Wildlife Division Waterfowl Funds, and additional funds from Ducks Unlimited and the Gulf Coast Joint Venture).
- **Monitoring beach-nesting birds in southwestern Louisiana.** S. Collins with E. Johnson, Audubon Louisiana (funded by American Bird Conservancy and grants awarded to Audubon Louisiana)
- **Managing coastal wetlands for wildlife and suitability in the face of sea level rise.** J. Marty with S. King, and S. Graham, LSU (funded by Rockefeller Operating Funds).

PUBLICATIONS BY RWR STAFF BIOLOGISTS

Marty, J.R., S.A Collins, J.M. Whitaker. 2018. Extralimital Records of Louisiana-Banded Mottled Ducks Recovered in North Dakota. Notes of the Southeastern Naturalist 17:51-55.

Selman, W. and Collins, S.A., 2018. Observations of wintering piping plovers (*Charadrius melodus*) positively associated with rock breakwater-influenced shorelines in southwestern Louisiana. Journal of Coastal Research, 34(5), 1046–1051. Coconut Creek (Florida), ISSN 0749-0208.

King, S.L., W. Selman, P.L. Vasseur, and S.E. Zimorski.2018. Louisiana Nonmigratory Whooping Crane Reintroduction. (Chapter 22). In: French, Jr., J.B., Converse, S.J., Austin, J.E. (Eds.), Whooping Cranes: Biology and Conservation. Biodiversity of the World: Conservation from Genes to Landscapes. Academic Press, San Diego, CA.

Vasseur, P.L., S.E. Zimorski, E.K. Szyszkoski, J.M. LaCour, and J.S. Lankton. In prep. Wing abnormality in a wild-hatched Whooping Crane (*Grus americana*) chick from the Louisiana nonmigratory population

TECHNICAL ASSISTANCE, OUTREACH AND EDUCATION

RWR places a high importance on education and outreach. Each year a litany of groups visit the refuge and receive talks on marsh management, coastal protection and many other educational topics related to wetland ecology.

Typically, these groups are overnight groups coming on weekends to spend time at the general quarters facility next to the RWR office. During FY 2016-2017 both the office and general quarters underwent cosmetic renovations on their exterior, including new windows to help with insulation. During the months of October 2016 to June 2017, the general quarters was inoperable as an overnight facility for visitors. The renovations were nearing completion in expectation of the annual Marsh Maneuvers program in July 2017.

One of the largest groups the refuge hosts each summer is the 4-H Marsh Maneuvers Camp. In 2017, 65 high school students from 18 parishes throughout Louisiana participated in the week-long camps in July. These camps are designed to educate high school students in the importance of coastal marsh erosion, restoration, conservation and ecology.

Students on field trips to Rockefeller often visit the beach and see first hand the erosion taking place from Shell hash. PIO Gabe Giffin stands feet below the students on the backside marsh to exemplify where the erosion is taking place.

In addition to formal education and outreach opportunities, a new refuge website (*www.rwrefuge.com*) was completed in 2015 to display the different ongoing refuge activities. The main topics presented on the website include public use, management and research, with the latter serving as a repository for the 500+ publications, reports and conference abstracts by RWR staff since 1955. The public use section has provided much improved information for visitors, particularly recreational fishermen.

Examples of other technical assistance provided by RWR staff include:

- organizing, compiling and participating in Christmas Bird Counts.
- assisting the Natural Heritage Program by conducting surveys for winter plover species and beach nesting birds on RWR beaches, while also conducting marsh bird surveys at Cameron Parish sites.
- completing mourning dove banding for the statewide dove monitoring program.
- assisting private landowners in assessing marsh conditions and management for waterfowl.
- conducting peer-review and editorial duties for scientific journals; reviewing graduate student theses.
- participating in guided tours to the whooping crane pen site, Nunez Woods Bird Sanctuary and around RWR.
- presenting on the Whooping Crane Reintroduction Program to multiple grade school, college, local and professional groups, as well as providing an informational table at multiple local and state festivals.
- presenting lectures to visiting college and university students on wetlands ecology, wetlands management, waterfowl ecology and conservation research.
- reviewing research and grant proposals for university students and faculty.
- participating in career fairs for Cameron Parish School District and the LSU AgCenter.

RWR staff also participated in guided tours for a number of organizations and groups (601 technical assistance contacts, 3,384 general information contacts and 2,366 group contacts).

RECREATIONAL USE

Marsh management units, and more specifically water control structures, continue to be very popular with sport fishermen. For the third consecutive year since hurricanes Rita and Ike, all water control structures via Joseph Harbor boat launch were fully operational; we were able to enhance the fishing opportunities while also maintaining adequate salinity levels. New recreational opportunities include the new Tom Hess Structure (dedicated October 2015) that manages the Price Lake Unit. Other recently completed projects - such as the new boat launches and bulkheading at Joseph Harbor (FY 2012-2013) and new fishing piers on Price Lake Road (FY 2012-2013 and FY 2013-2014) - have continued to be a great attraction for local and regional fishermen. The new recreational projects completed over the last five years have greatly enhanced the fishing opportunities at these already popular recreational areas.

In FY 2017-2018, 115,724 vehicles (approximately 272,019 person use days) were counted entering the refuge, which is approximately 2 percent less than 2016-2017 data (118,909 vehicles and 279,281 people use days).

***LEFT:** Price Lake Road on a Saturday during peak usage, April 2018. **RIGHT:** A father-son fishing along Price Lake Road, in Grand Chenier, Louisiana*

WHITE LAKE WETLANDS CONSERVATION AREA

LOCATION

The White Lake Property (as referred to in Act 613, 2004 Louisiana Legislature) or White Lake Wetlands Conservation Area (WLWCA) (as referred to by LDWF) is located in Vermilion Parish. The contiguous unit is 70,965 acres, located along the western boundary of Vermilion Parish; it is bounded on the south by White Lake, and the northern boundary is 7.4 miles south of Gueydan at the south end of Hwy. 91. Lafayette is 32 air miles northeast, and Lake Charles is 40 air miles northwest. The southern boundary of White Lake is 17.5 miles north of the Gulf of Mexico. The property averages 12 miles from east to west and 9 miles from north to south.

HISTORY OF OWNERSHIP

BP America Production White Lake properties have a long history of company ownership and management. Note that Stanolind Oil and Gas Company (Stanolind) preceded Amoco Production Company (Amoco) which preceded BP America Production Company (BP). Stanolind acquired the 70,965-acre property from Wright Morrow by Act of Sale on July 31, 1935. This sale included all of the property acquired by Yount-Lee Oil Company from P. L. Lawrence, et. ux., by Act of Sale dated March 7, 1931 and a portion of the property acquired by M.F. Yount from Elizabeth M. Watkins by Act of Sale dated Nov. 5, 1929. BP owned and managed the BP American Production White Lake Property until July 8, 2002 when BP donated the property to the state of Louisiana. On July 8, 2002, a Cooperative Endeavor agreement between the state and White Lake Preservation Inc. (a 501(c) 3 corporation) for management of the property was executed. On Jan. 1, 2005, Act 613 of the 2004 Regular Legislative Session became effective. This act established:

1. Transfer of property management from White Lake Preservation Inc. to LDWF.
2. The White Lake Property Advisory Board, LDWF and the Wildlife and Fisheries Commission powers and duties relative to the management of the White Lake Property.
3. A special account within the Conservation Fund for the White Lake Property.

On Dec. 17, 2004, the state, BP and White Lake Preservation Inc. signed a Transition Agreement for the management of the property by White Lake Preservation Inc. until July 1, 2005, at which time LDWF took total control.

SURFACE LEASES

AGRICULTURAL AND HUNTING

There are currently 37,841 acres of property leased out in nine separate tracts. The property is leased to eight separate tenants for the purpose of farming, raising cattle, crawfish farming and hunting. There is a rice base totaling 4,587.5 acres on this property. There were approximately 1,800 acres of rice planted in 2018. There were approximately 1,200 acres of crawfish ponds on the property in 2018.

There are over 100 miles of levees, canals and roads on WLWCA agricultural lands that are maintained by our agricultural tenants. They also own and operate the pumping systems that are needed to manage water levels on this impounded agricultural land. All of the farmland on WLWCA was at one time freshwater marsh that was impounded in the late 1940s when agricultural activities first began on the property.

TRAPPING

There were 327 alligators harvested in the 2017 alligator trapping season. The average size of the alligators trapped was 6.56 feet, with an average live length value of $5.65 per foot.

There was a contract negotiated for the collection of alligator eggs from the WLWCA property in 2015 for a three-year period. In 2017, WLWCA received a payment of $36.67 per egg. A total of 7,244 eggs were collected.

OTHER SURFACE LEASES

There are three oil and gas valve site leases on the property. In addition there is one oil & gas surface use agreement with an associated road servitude agreement.

LOTTERY ACTIVITIES

FISHING LOTTERY

2017 - One-hundred fishing permits were issued at a cost of $40 per permit. Permittees and their guests were allowed to fish the Florence Canal Area and specified well location canals that flow into the Florence Canal. The area was open from sunrise to sunset from March 15 - Aug. 15, 2017

2018 - One-hundred fishing permits were issued at a cost of $40 per permit. Permittees and their guests were allowed to fish the Florence Canal Area and specified well location canals that flow into the Florence Canal. The area was open from sunrise to sunset from March 15 - Aug. 15, 2018

WATERFOWL LOTTERY

Waterfowl Hunting (2017-2018 Season)		
	Total Hunts	**Participants**
Teal Lottery Hunts	9	100
Marsh Lottery Hunts	10	100
Youth Hunts	2	16
Rice Field Lottery Hunts	30	233
Group Hunts	12.5	149

Waterfowl Hunting Results (2017-2018 season)		
	Marsh	**Rice Field**
Total Ducks Harvested	1,955	398
Average Kill/Hunter (ducks)	5.12	1.71
Total Geese Harvested	249	57
Average Kill/Hunter (geese)	0.65	0.24

NON-CONSUMPTIVE ACTIVITIES

LDWF established dates for the use of WLWCA facilities for non-consumptive group activities including nature photography, bird watching, educational field trips and business retreats. Use of WLWCA for non-consumptive purposes was offered from Feb. 1 - May 31, 2018. Site use could be scheduled on a first come first serve basis pending facility and staff availability, with up to 15 guests allowed to attend the day trips and up to 12 guests allowed to attend the overnight trips. We had no non-consumptive group participation during FY 2017-2018.

BIRDING TRAIL

The WLWCA Birding and Nature Trail, with accompanying kiosk, was completed in April 2012. The trail is on approximately 30 acres of

Painted bunting on the White Lake Wetlands Conservation Area Birding and Nature Trail

property located on the northern boundary of the property where LA-91 ends. Birding paths, a parking area, access bridges, a birding tower and a picnic pavilion are open to the public. There were approximately 67 logged names in our visitor's guest book in FY 2017-2018.

EDUCATION, OUTREACH AND RESEARCH

MARSH MANEUVERS

During December 2017, WLWCA was host to a group of 16 teenage 4-H students for three days. The three-day camp was designed to educate the students on the importance of coastal erosion, restoration, conservation and ecology. They were also able to go on a morning marsh tour and were taught waterfowl identification techniques. They participated in a sporting clay shoot where they were instructed on gun safety and the proper use of a shotgun.

COASTAL PRAIRIE

There is approximately 200 acres of coastal prairie on the WLWCA property located south of the Gulf Intracoastal Waterway and west of the Florence Canal. For the past couple of years the Louisiana Natural Heritage Program has been conducting research on the different plant species located on this prairie. To date, approximately 95 different species have been identified. A coastal prairie enhancement project is currently ongoing with the Louisiana Natural Heritage Program that includes prescribed fire and herbicide application to reduce woody encroachment. This project is funded through the State Wildlife Grants Program.

WHOOPING CRANE REINTRODUCTION PROGRAM

WLWCA assisted the Whooping Crane Reintroduction Program by providing office space, staff and vessel support. In addition, WLWCA staff maintained the 700-acre impoundment and assisted with installation of an additional pen and associated release site.

WOOD DUCK PROJECT

WLWCA continued a wood duck nesting box and banding program to complement the LDWF statewide program. In the 2017 calendar year, 27 wood ducks were banded and 43 were recorded as recaptures. In addition, 10 black-bellied whistling-ducks were banded and six were recorded as recaptures. In addition to banding birds, staff monitored nest boxes and collected nesting data. In the 2017 nesting season, 66 nesting boxes were monitored and maintained. These boxes produced 58 successful wood duck nests and 598 hatchlings. Black-bellied whistling-ducks used the same nesting boxes to produce 13 successful nests and 336 hatchlings.

MARSH MANAGEMENT RESTORATION, HABITAT ENHANCEMENT, AGRICULTURAL MANAGEMENT, AND MINERAL MANAGEMENT

MARSH MANAGEMENT

The WLWCA property consists of approximately 52,000 acres of fresh water marsh. There are four separate management units that comprise the marsh. Within these

Whooping Crane Cohort 8 arrived a the Jennings Airport around 2 p.m. on Nov. 8, 2017. The Whooping Crane team unloaded the birds, trailered them down to White Lake and proceeded to the temporary pen.

marsh areas there are over 100 miles of trenasses, seven water control structures, four pumping stations, and over 30 miles of levees, all of which are operated, managed and maintained by WLWCA personnel. Objectives of maintenance and manipulation of the refuge's system of levees and water control structures vary somewhat by management unit, but generally goals are to maintain marsh health, provide conditions favorable for production of waterfowl food plants, and incorporate multi-species management when possible.

As part of the overall management of the WLWCA properties, in the fall of 2008 a comprehensive set of rules and regulations was drafted and presented to the Wildlife and Fisheries Commission for approval. The White Lake Rules and Regulations were approved by the Commission and became effective in the spring of 2009.

AGRICULTURAL MANAGEMENT

Although WLWCA is comprised mostly of marsh, the property consists of approximately 19,000 acres of agricultural land. The agricultural land is separated into seven tracts that are leased out to the highest bidder. Each leaseholder follows an LDWF lease agreement that directs the leaseholder to complete numerous habitat management practices each year. These practices maintain the property in farmable condition, while also providing valuable habitat for wildlife. The benefits to the leaseholder are the ability to farm, graze and hunt the property.

MINERAL MANAGEMENT

There are three producing oil and gas fields on the WLWCA property that were once operated by Amoco Production Company. Amoco sold the subsurface rights in these fields and all the facilities associated with these fields in the latter part of the 1990s to Hilcorp Energy Company. Hilcorp has since sold these fields, and for a period of time they were operated by three separate owners/operators: the West White Lake Field (approximately 1,500 acres) was owned and operated by Energy Quest; the Florence Field (approximately 1,920 acres) was owned and operated by Dune Energy Company; and the South Kaplan Field (approx. 800 acres) was owned and operated by Texas Petroleum Investments. In the spring of 2010, Texas Petroleum Investments purchased the West White Lake and Florence Field and became the sole oil and gas operator on the WLWCA property. However in July 2011 Magnum Producing secured a mineral lease from BP to drill an exploratory well in the Kaplan Field Area. LDWF granted a Surface Lease to Magnum Producing to facilitate the drilling of this well. This well was successfully completed and is currently producing. In 2013 LDWF granted Magnum Producing an additional Surface Lease for a Salt Water Disposal Well, which also included a road servitude and P/L right-of-way agreement. The State of Louisiana owns the surface of the property that comprises these three production areas. LDWF monitors surface activities and helps enforce the conservation terms of the agreements that were executed by and between Amoco Production Company, BP and the three owners/operators mentioned. Texas Petroleum Investments has responsibilities for maintenance of roads, levees, canals, bridges, etc.

MAINTENANCE OF FACILITIES AND EQUIPMENT

There are approximately 50 acres of property associated with the White Lake lodge facility, sporting clay course, skeet range, birding trail and Florence Canal Landing area. This acreage is maintained and landscaped throughout the year by WLWCA personnel.

Routine maintenance on the WLWCA buildings and equipment was conducted throughout the year.

Routine maintenance was performed on our fleet of more than 25 boats. Our three mud boats were dry-docked and repainted, and other routine annual maintenance was done.

Nearing completion is a new office site composed of a pond, parking lot, and elevated office building.

2017-2018 FINANCIAL REPORT

Totals	
Beginning Fund Balance 2017-2018	$2,571,942
Total Revenue	$1,428,605
Total Expenditures	$1,026,518
Ending Fund Balance 2017-2018	$2,974,029

Expenditures	
Salaries	$363,092
Wages	$26,760
Related Benefits	$203,796
Travel	-
Operating Services	$208,555
Supplies	$122,252
Professional Services	$1,735
Other Charges	-
Acquisitions	$66,217
Major Repairs	$33,985
Interagency Transfers (insurance)	$127
Total	***$1,026,518***

Revenue	
Group Hunt Trip Fees	$371,501
Group Hunt Charitable Contributions	-
Agricultural Leases	$516,463
Hunting Leases	$216,912
Alligator Egg Collection	$198,957
Lottery Hunt Fees	$54,345
Alligator Trapping Income	$4,843
Interest Income	$32,363
Mineral Bonuses	-
Right of Way	-
Surface Leases	$25,636
Surplus Property	$2,696
FEMA Reimbursements	-
Oil and Gas Royalty	-
Non-Consumptive Trips	-
Fishing Lottery	$4,890
Prior Year Revenue Adjustments	-
Total	***$1,428,605***

LOUISIANA NATURAL HERITAGE PROGRAM

The Louisiana Natural Heritage Program (LNHP) is charged with the conservation of Louisiana's rare, threatened and endangered plant and animal species, nongame birds and habitats. Staff conduct research and management projects on species and habitats of greatest conservation need as identified in the State Wildlife Action Plan. Data concerning rare elements are stored in the Biotics database system. These data are then used to determine potential adverse impacts to the environment from proposed projects. The program is composed of staff that focus on data, botany/community ecology, zoology, state wildlife grants & wildlife action plan coordination, and marine mammal and sea turtle strandings.

LNHP OUTREACH AND PUBLIC EVENTS

LNHP staff participated in many outreach presentations and public events throughout Louisiana in FY 2017-2018 including Louisiana Master Naturalist Program Spring and Fall workshops, summer kids' camps, festivals, career fairs for high school students, guest speakers for elementary and middle schools, university field labs, articles for the "Wildlife Insider," and the 2018 LDWF Research and Management Symposium.

WILDLIFE ACTION PLAN AND STATE WILDLIFE GRANTS PROGRAM

In November 2001, Congress created the State Wildlife Grants Program. According to the federal legislation that created the program, State Wildlife Grants was established "for the development and implementation of programs for the benefit of wildlife and their habitat, including species that are not hunted or fished." The inclusion of species that are not hunted or fished is a crucial aspect of the State Wildlife Grants Program, as many of these species previously had no existing source of funding. The State Wildlife Grants Program is now the primary funding source for non-game conservation nationwide, with the stated goal of preventing species from being federally listed as threatened or endangered.

WILDLIFE ACTION PLAN REVISION

Congress stipulated that each state fish and wildlife agency that wished to participate in the State Wildlife Grants Program develop a Comprehensive Wildlife Conservation Strategy (Wildlife Action Plan) by October 2005. In response, LDWF developed a Wildlife Action Plan to establish conservation needs and guide the use of State Wildlife Grants funds for the next 10 years. A crucial aspect of the Wildlife Action Plan is the identification of species of greatest conservation need (SGCN), which are those species most in need of conservation action as identified by each state. The Wildlife Action Plan was submitted for approval to the National Advisory Acceptance Team and was subsequently approved in December 2005. The Wildlife Action Plan is the roadmap for non-game conservation in Louisiana, and must be reviewed and revised every 10 years to ensure that it remains an effective tool for conservation planning and implementation.

The first comprehensive revision of the Louisiana Wildlife Action Plan was completed and submitted to USFWS during FY 2015-2016, and final approval was received from USFWS during FY 2016-2017. The 2015 Louisiana Wildlife Action Plan is now available via the LDWF website (*www.wlf.la.gov/wildlife/wildlife-action-plan*), and a limited number of hard copies were procured as well for internal and partner use.

FY 2017-2018 STATE WILDLIFE GRANTS FUNDING CYCLE AND GRANT MANAGEMENT ACTIVITIES

The State Wildlife Grants Program is funded by annual Congressional appropriations. USFWS apportions these funds to state fish and wildlife agencies based on the land area and population of each state. Since the inception of the State Wildlife Grants Program, the State of Louisiana has received approximately $14.9 million in federal State Wildlife Grants funding, with an apportionment of approximately $700,000 in FY 2017-2018. Louisiana has funded 171 projects through the State Wildlife Grants Program to date. Funded State Wildlife Grants projects have included biological inventories, research projects, habitat management and the development and maintenance of databases. A wide range of SGCN have benefited from State Wildlife Grants funding in Louisiana, including the Louisiana black bear, whooping cranes, swallow-tailed kites, reddish egrets, alligator snapping turtles, freshwater mussels and neo-tropical migrant songbirds.

State Wildlife Grants proposals are accepted by LDWF on an annual basis, and include projects developed by LDWF personnel, non-governmental organizations and universities.

Botanist teaching about longleaf pine savannahs to the Southwest Louisiana Association of Master Naturalists.

TABLE 1.

New Louisiana State Wildlife Grants Opened During FY 2017-2018
Wild Bees in Fire-managed Eastern Upland Longleaf Pine Ecosystems
Assessing the Current Status and Distribution of Southern Crawfish Frogs in Louisiana
Coordinated Surveys for Alligator Snapping Turtles in Louisiana
Distributional Assessment of Imperiled Fishes in Louisiana
Using Land Cover to Refine Conservation Opportunity Areas in Louisiana: a Geostatistical Modeling Approach
Identifying Priority Amphibian and Reptile Conservation Areas
Cooperative Research to Inventory and Monitor the Current Status, Abundance, and Distribution of the Saltmarsh Topminnow, and Two Associated Killifish SGCN, Phase 2
Promotion of Prescribed Burning As a Management Tool on Selected Habitat Types Within the Louisiana East Gulf Coastal Plain
Coastal Prairie Conservation Opportunity Area Corridor Evaluation and Survey
Habitat Use and Home Range of Bachman's Fox Squirrels in Southeast Louisiana
Population Monitoring and Surveillance for White-nose Syndrome in Six Bat Species of Greatest Conservation Need in Louisiana
Assessing Seaside Sparrow Abundance, Distribution, Annual Survivorship, and Nesting Productivity in Southwest Louisiana
Status Surveys For Frecklebelly Madtom In The Pearl River Drainage Of Louisiana

TABLE 2.

New Louisiana State Wildlife Grants Closed During FY 2017-2018
Coastal Bird Monitoring: Colonial Nesters and Secretive Marsh Birds
Promotion of Prescribed Burning as a Management Tool on Select Habitat Types within the Louisiana WGCP
White-nose Surveillance in Louisiana
Multistate Sandhills/Upland Longleaf Ecological Restoration Project (Phase 3)
RTE Species and Natural Communities Located on Louisiana WMAs and Refuges
A Biogeographic Analysis of the Crawfish Biodiversity of Northwestern Louisiana
Aquatic Invertebrate and Habitat Assessment to Define a Reference Condition for IBI Development in the South Central Plains Ecoregion, Louisiana

***LEFT:** Hurter's spadefoot toad detected while conducting rare amphibian surveys on private lands in Sabine Parish. **RIGHT:** Eastern hog-nosed snake found while conducting rare snake surveys in Bienville Parish.*

State Wildlife Grants proposals are reviewed by LDWF's State Wildlife Grants Committee, consisting of 13 biologists representing the Coastal and Non-Game Resources Division, Inland Fisheries, Marine Fisheries and Wildlife Division.

During FY 2017-2018, 17 new project proposals were received for funding consideration. Thirteen proposals received approval by the State Wildlife Grants Committee by the end of FY 2017-2018, and had been submitted to USFWS for approval, along with all required documentation (*Table 1*). After grant closings on June 30, 2018, there remained 38 ongoing State Wildlife Grants-funded projects.

During FY 2017-2018, seven State Wildlife Grants were closed (*Table 2*). Copies of final reports for all closed State Wildlife Grants are available to interested parties upon request. Ten grant amendments were submitted to USFWS during FY 2017-2018, and 58 grant reports were submitted to USFWS during FY 2017-2018.

STATE WILDLIFE GRANTS FUNDED RESEARCH PRODUCTS

Since the inception of the State Wildlife Grants Program in Louisiana, research funded through these grants has produced over 55 peer-reviewed publications, adding greatly to the body of knowledge concerning Louisiana's fish and wildlife.

DATA SECTION

LNHP gathers occurrence information for rare, threatened and endangered wildlife species and natural communities. These data are integral in determining the status and state rankings for SGCN, which drives the direction of non-game species research and conservation for the state of Louisiana. The information is stored in easily accessed GIS computer database files known as Biotics, which was developed by the Natural Heritage Network's parent organization, NatureServe. During FY 2017-2018, a total of 2,011 Element Occurrence Records were added and/or updated in Biotics along with the associated information including location, species population status and habitat condition.

The Bald Eagle Dataset received significant updates, modifications and additions in Biotics from information gathered during surveys conducted by LNHP Ornithologist Michael Seymour in February 2018. Seymour surveyed all known bald eagle nest sites in south Louisiana. This survey resulted in 462 updated Bald Eagle Element Occurrence Records and 44 new Bald Eagle Element Occurrence Records that were added into the database. Bald Eagle Productivity Flights were also conducted by Seymour in March 2018. These flights resulted in the update of 77 records. During FY 2017-2018, LNHP enhanced the fish data in Biotics by incorporating information from Fishnet2. This web-based site provides open access to data housed in fish collections worldwide. The data contains information from natural history museums, universities and a number of other institutions. Fishnet2 was queried by staff for inland fish SGCN. This dataset resulted in the creation of 288 Element Occurrence Records and the update of 60 records. There were 11 species from this dataset that were being entered into the system for the first time including longjaw minnow (*Notropis amplamala*), saddleback darter (*Percina ouachitae*) and sicklefin chub (*Macrhybopsis meeki*).

The Biotics database is used daily by LNHP staff to review construction activities and development projects planned by government and private entities throughout the state. These activities range from small to large-scale projects including residential, commercial and industrial development, and the development of pipelines and roads. These activities repeatedly threaten SGCN and natural habitats across the state, and LNHP is tasked with reducing and limiting these threats as much as possible.

Throughout the year, government and private entities will request species and habitat reviews for projects occurring in Louisiana. These reviews are collectively referred to as private consultant projects. The requesting organization submits a description of the proposed project to LNHP and a query of the LNHP database is run against the proposed project area. The results of the query show SGCN and natural communities within 1 mile of the project area. A comment letter is submitted to the requesting organization identifying potential impacts to SGCN, communities and critical habitats. The letter also indicates the presence of scenic rivers, state or federal parks, wildlife refuges and WMAs occurring within 400 meters of the project area.

LNHP receives Coastal Use Permits submitted to LDWF by the Louisiana Department of Natural Resources (LDNR). Coastal Use Permits are required for commercial, residential and oil and gas projects occurring within Louisiana's Coastal Zone. LDNR houses a subset of the LNHP database, allowing LDNR to flag Coastal Use Permits that occur near SGCN. These flagged permits are forwarded to LNHP biologists for review. As with private consultant reviews, comments are generated for potential impacts to SGCN, critical habitats and natural communities. The presence of scenic rivers, state or federal parks, wildlife refuges and WMAs within the project area are also included in the comment letter. The LNHP's comments, along with comments from other programs within LDWF, are consolidated and an agency-wide letter is submitted to LDNR.

LNHP also reviews USACE permits, as well as permits from other regulatory agencies. These reviews are collectively referred to as internal reviews due to the fact they are received by LNHP from other departments within LDWF.

In FY 2017-2018, LNHP staff conducted 1,312 project reviews, which included 448 private consultant project reviews, 748 new or modified Coastal Use Permits, and 116 internal project reviews. This was a 7.5 percent increase from the previous fiscal year.

The LNHP Database Section processed 30 digital data requests for private consultants, timber companies, nonprofit organizations and universities. The digital data request involves large-scale projects. The requesting organization submits a description of the proposed project to LNHP, and a query of the LNHP database is run against the proposed project area. The results of the query show SGCN and natural communities within a predetermined distance stated in the project request letter. A comment letter is submitted to the requesting organization identifying potential impacts to SGCN, natural communities and critical habitat, along with point and/or polygon data and associated species information. The information provided by LNHP is applied to land use decisions, environmental impact assessments, resource management, conservation planning, endangered species reviews, research and education.

PROJECTS

The Database Section worked on the State Wildlife Grants project "Database for Tracking Rare, Threatened, and Endangered Species" (T236).

- This grant provides funding for a contractor to manage the backlog of plant, animal and natural community data collected and housed by LNHP.
- The contractor organizes and identifies tracked species in previously conducted surveys, determines if the extracted information qualifies as a new Element Occurrence Record or an updated record, prepares the data by digitizing polygons in ArcGIS, and enters the information into Biotics.
- During FY 2017-2018, the following large-scale datasets were updated in Biotics:
  - Bald Eagle
  - Fishes (34 species)
  - Piping, Snowy & Wilson's Plover
  - West Indian Manatee
  - Louisiana Pearlshell Mussel
  - Crawfish (8 species)
  - Herpetofauna Museum Data (9 species)
  - Louisiana Pinesnake
  - Gopher Tortoise
  - Natural Community Data for Natural Areas (19 natural community types)
  - Kisatchie National Forest and Peason Ridge WMA Plant Surveys
- The funds in this grant are used to help LNHP determine potential impacts of large-scale projects on SGCN and natural community habitat types, provide existing SGCN and natural community data for multi-jurisdictional projects that incorporate large-scale conser-

LEFT: *The Kisatchie painted crawfish found during Louisiana pearlshell surveys on Bayou Clear in Rapides Parish is listed as a Species of Greatest Conservation Need in the LA Wildlife Action Plan.* ***CENTER:*** *A Gulf Coast waterdog found while conducting rare amphibians surveys in the Florida Parishes of Louisiana.* ***RIGHT:*** *A sandbank pocketbook observed during mussel surveys on Fort Polk is listed as a Species of Greatest Conservation Need in the LA Wildlife Action Plan.*

vation efforts, and share data with cooperators.
- There were six large-scale data exchanges completed for three timber companies, two non-governmental organizations, and one university.
- The funds in this grant were also used to review and comment on Coastal Use Permits submitted to LDWF by LDNR and USACE. During FY 2017-2018 staff conducted 748 new or modified Coastal Use Permit reviews and 116 internal project reviews.

The Database Section completed the State Wildlife Grants project "Rare, Threatened and Endangered Species and Natural Communities Located on Louisiana WMAs and Refuges" (T-108).

- The funds from this grant were used to provide current and reliable information on Louisiana's threatened and endangered species, SGCN, and natural communities within LDWF's WMAs and refuges.
- An ArcGIS shape file was created with the property boundary for each WMA and refuge.
- The database was queried for all Element Occurrence Records intersecting the property boundary for each WMA and refuge.
- A list was then created for each WMA and refuge. The list includes threatened and endangered species, SGCN and natural communities known to occur or have the possibility of occurring on the WMA or refuge.
- Satellite imagery, Biotics data, online databases such as eBird and FishNet2, and expert opinion were used in the development of these lists.

The Conservation Fund Project

- Database staff provided information on preferred soils of the Louisiana pinesnake and locational data on West Coast Coastal Plain Flatwood Pond sites within Clear Creek WMA located in Vernon Parish.
- These data were used to assist The Conservation Fund when applying for a Forest Legacy grant.
- If awarded, the funds will be used to place a working forest easement on a portion of Clear Creek WMA.

BOTANY SECTION

The main responsibilities of the Botany/Community Ecology Section include:

- Determining which plant species and natural communities (habitats) are rare, threatened and endangered in Louisiana.
- Actively monitoring all sensitive (rare, threatened, and endangered) plant species and natural communities in Louisiana.
- Conducting botanical inventories and ecological assessments on all types of land ownership.
- Interacting with landowners and managers to promote conservation of native plants and natural communities.
- Administering the Natural Areas Registry Program.
- Implementing habitat stewardship practices on LDWF-owned properties and private lands.
- Conducting education and outreach activities to promote understanding and appreciation of Louisiana's biological diversity.
- Providing curriculum guidance and training for the Louisiana Master Naturalist Program.
- Providing plant identification services to LDWF staff, natural resources professionals with other organizations, and the public. (181 plant identifications were made for clients during FY 2017-2018.)
- Contributing expert knowledge on Louisiana ecology and flora for conservation decision processes including environmental impact review, conservation planning, and habitat management.
- Providing direction, guidance and oversight to any LDWF interns working on botany/community ecology projects.

Most of the work of the Botany/Community Ecology Section is grant project-based. Currently, 10 projects are being successfully carried out, with all but one receiving external grant support. Some of the more active projects during FY 2017-2018 are explained in more detail below.

BOTANY/COMMUNITY ECOLOGY PROJECTS

- Botanical and Ecological Surveys on Kisatchie National Forest (Good Neighbor Agreement with USDA)
- Ft. Polk New Lands Botanical and Ecological Survey (U.S. Department of Defense/ USACE)
- Natural Areas Registry Program (State Wildlife Grants)
- Coastal Prairie Stewardship on White Lake Wetlands Conservation Area (State Wildlife Grants)
- Baird's Pocket Gopher Habitat Survey (State Wildlife Grants)
- Wildlife Habitat Inventory Initiative (State Wildlife Grants)
- Coastal Prairie Stewardship in Southwest Louisiana (Environmental Protection Agency's Gulf of Mexico Program)
- Enhancement of Pollinator Habitat on Coastal Prairie Rangelands (Environmental Protection Agency's Gulf of Mexico Program/USGS)
- Survey for Pondberry in the De Loutre Basin of Northeast Louisiana (State Wildlife Grants)
- TX Trillium Population Status Assessment of Private Lands in Caddo Parish, Louisiana (State Wildlife Grants)
- LDWF HQ Native Plant Gardens

BOTANICAL AND ECOLOGICAL SURVEY ON KISATCHIE NATIONAL FOREST, KISATCHIE AND CALCASIEU RANGER DISTRICTS

A cost sharing position between LDWF and USFS was created under the authority of the Good Neighbor Agreement #16-GN-11080600-001 to support a botanist to perform botanical and ecological surveys on Kisatchie National Forest. These surveys target rare, threatened and endangered species, SGCN, non-native invasive species and high-quality natural plant communities. The surveys aim to document new records and to update previously detected records within focal project areas slated for timber harvests and other habitat management activities. Deliverables include stand-level status update reports within each project area and findings of rare, threatened and endangered species, SGCN, non-native invasive species and natural plant communities along with spatial data delineating the location of each target element occurrence.

During FY 2017-2018, the botanist survey completed the 6,483 acre South Bob's Creek Project (Kisatchie Ranger District) area and completed the data report which was submitted to the Kisatchie Nation Forest botanist. Currently the botanist is working on

two projects; the 9,265-acre Drakes Creek Project (Calcasieu Ranger District, Vernon Unit) and the 5,792-acre Boggy Bayou Project (Calcasieu Ranger District, Evangeline Unit). Botanical and ecological surveys were also conducted in several other compartments on Kisatchie and Calcasieu Ranger Districts during opportune times of the year when some of the listed plant species of concern were more readily identifiable. Occurrences for six plant communities and five SGCN were identified during the reporting period. The status of all records are being updated in USFS and LDWF databases.

NATURAL AREAS REGISTRY

Almost 90 percent of Louisiana's 43,566 square-mile area is privately owned. Therefore, private landowners hold the key to conservation of Louisiana's native habitats and the animal and plant species they support. Motivated by this fact, the Louisiana Natural Areas Registry was created by an Act of the Louisiana Legislature (Acts 1987, No. 324, §1, eff. July 6, 1987) to establish a program through which landowners of all types may voluntarily agree to protect the natural integrity of their properties, thereby safeguarding the best remaining examples of the state's natural heritage. Enrollment of properties in the registry involves a voluntary, non-binding agreement between landowners and LDWF. The Natural Areas Registry is coordinated by the LNHP Botany/Community Ecology Section. To date, 126 properties are enrolled in the registry. These properties capture 52,569 acres and are distributed in 38 of Louisiana's 64 parishes. Thirty-three different natural communities and numerous populations of rare animals and plants are found on Natural Areas.

Responsibilities of LDWF to the Natural Areas Registry include:

- Assessing habitats on existing Natural Areas and providing information to landowners.
- Providing technical assistance regarding species and habitat ecology and management to landowners.
- Directing landowners to funding opportunities to implement habitat stewardship.
- Implementing appropriate habitat management.
- Advocating Natural Areas protection.
- Modifying agreements and deactivating Natural Areas for various reasons (e.g. ownership changes).
- Evaluating properties for potential inclusion in the Natural Areas Registry.
- Enrolling new properties in the Natural Areas Registry.
- Distributing a regular newsletter ("Bluestem") to registry participants and others interested in Natural Areas.

Funding for the Natural Areas Registry Program was renewed through a State Wildlife Grant, which will allow operation of the registry through 2020. A new capability for the registry will be direct implementation of habitat stewardship practices on Natural Areas. Previously, LDWF was limited to assisting landowners secure funding for habitat management elsewhere. A process was devised whereby landowners of enrolled properties may request assistance. The initial intake period began at the beginning of this reporting period. Four of the six properties that requested assistance will be receiving some form of assistance. Delacroix Preserve is receiving funding to assist with feral hog control and invasive plant control, Bonds Crossing received funds to conduct a prescribed burn and Evergreen Farms at Carter Bottoms, and Sugarcreek Farm will be receiving funds and technical assistance to re-establish native grassland/wildflower meadows.

COASTAL PRAIRIE STEWARDSHIP

Coastal prairie is an extension of tall-grass prairie from the eastern Great Plains. This grassland historically occupied ca. 2 million acres in southwest Louisiana. Because of modern agriculture practices, less than 0.2 percent of this prairie remains intact in Louisiana. The Coastal Prairie Research and Stewardship Initiative began in 2013 following the discovery of new coastal prairie remnants in the Lake Charles area that quadrupled the known acreage of remnant prairie in Louisiana. Calcasieu and Cameron parishes still feature a considerable amount of grazing lands, in contrast to the prairie region of Acadiana, which is largely under rice or sugarcane cultivation. The newly discovered prairie remnants are used as rangeland. While "passive" farming has been carried out on some of this prairie acreage, most of the rangeland prairies have never been plowed.

Relationships between LDWF and three family-owned ranches have strengthened. The goal of these partnerships is to enhance coastal prairie habitat through stewardship and grazing optimization. During FY 2017-2018, 1,539 acres of remnant coastal prairie were enhanced by prescribed burning conducted by LDWF, with burns led mainly by Botany/Community Ecology staff members. Approximately 20 acres of dense brush were treated with herbicide using back pack chemical sprayers, and was completed by the Botany/Community Ecology team in order to reclaim native grassland on one site. Additional mechanical and chemical brush control is planned for next fiscal year.

COASTAL PRAIRIE STEWARDSHIP ON WHITE LAKE WETLANDS CONSERVATION AREA

White Lake Wetlands Conservation Area is the only state- or federally-owned conservation area in Louisiana to support remnant coastal prairie, which is a critically imperiled plant community. The prairie at White Lake Wetlands Conservation Area occurs on Deer Ridge, an elevated ridge embedded within freshwater marsh. The Deer Ridge Prairie totals ca. 270 acres. This is the wettest expression of coastal prairie due to its low elevation and marsh-fringe setting. The imminent threat facing coastal prairie on White Lake Wetlands Conservation Area is woody plant species encroachment by Chinese tallow tree (*Triadica sebifera*), and to a lesser extent, by waxmyrtle (*Morella cerifera*). Prior to initiation of this project, woody vegetation covered 25 percent of the prairie (72 acres). The objective of this project is to reduce woody cover on the White Lake Wetlands Conservation Area prairie from 25 percent to less than 10 percent by implementing a combination of herbicide applications targeting woody plants, and prescribed fire. (Except from the 2018 Interim Report)

During the reporting period, Chinese tallow trees and other woody species received herbicide treatment to reduce woody species cover. On Sept. 18, 2017, a fixed-wing aircraft treated woody vegetation in the northeast section of the Deer Ridge prairie (approximately 22.5 acres) and other large trees or large clumps of wood brush. A site visit was conducted on March 3, 2018 to develop a cursory assessment of herbicide impacts to woody vegetation. Although early in the year, many Chines tallow trees adjacent to or near the Deer Ridge costal prairie had or were leafing out, while the herbicide treated areas had no leaves and appeared to be killed. On site vegetation sampling and remote sensing analysis will be conducted in the fall of 2018 and spring of 2019 respectively, to further assess the level of woody species encroachment and natural community health.

BAIRD'S POCKET GOPHER HABITAT SURVEY

Baird's pocket gopher (*Geomys breviceps*) is the preferred food source and Baird's pocket gopher burrows are the sole hibernation den source for the Louisiana pinesnake (*Pituophis ruthveni*). Information is lacking on the natural history of both species and the population health/status of both species are of concern. However, it is well documented that the Louisiana Pinesnake is dependent on the Baird's pocket gopher. The influence of vegetation and soil texture on the density of Baird's pocket gopher in the state were evaluated to better understand influence of habitat selection and population densities, which would then provide some insight for managing Louisiana pinesnakes.

The Botany team's roll with this project was to support McNeese graduate students by providing botanical expertise and collect plant community species composition data. Botanical inventories were conducted at all of the 0.25 ha. study plots and a plant species check list was provided for each study plot. In addition, all of the 10 sub-plots within each plot was surveyed by identifying all plants and estimating a percent cover for each plant. All data was provided to McNeese students for analysis.

ZOOLOGY SECTION: Endangered Species, Reptile & Amphibian Program, Nongame Bird Program & Permits Coordination, and Marine Mammal & Sea Turtle Stranding & Response Program

LNHP administered federal aid grants for SGCN through the Endangered Species Act Section 6 Program, Multi-state State Wildlife Grants, and Louisiana's State Wildlife Grants Program. Section 6 projects included the following species: Louisiana pearlshell mussel, Louisiana pinesnake, gopher tortoise and black rail, as well as endangered species coordination. Section 6 Cooperative Agreements were renewed between LDWF, USFWS and NOAA.

Section 6 funds allowed staff to work on a multitude of rare, threatened and endangered species issues including:

- Southeast Association of Fish & Wildlife Agencies - Wildlife Diversity Committee to address at risk species in the southeast.
- Continued partnership with USFWS and USDA-NRCS on Endangered Species Act coordination.
- Prescribed burning of public and private properties.
- White-nose syndrome surveillance, coordination and response planning.
- Louisiana pinesnake detection using camera traps.
- Participation on the Dusky Gopher Frog Recovery Team.
- Collection and preservation of petitioned crawfish DNA for genetic studies
- Gopher tortoise population assessment, habitat improvement and public outreach.
- Collaborating with private landowners for gopher tortoise status and potential habitat restoration.
- Habitat restoration at Sandy Hollow WMA for gopher tortoise and northern bobwhite.
- Response and coordination for waif gopher tortoises.
- Louisiana pearlshell mussel population trends, long-term monitoring protocol and data management.
- Louisiana pearlshell mussel conservation coordination with federal and parish partners.
- Spatial and temporal distribution of black rail (*Laterallus jamaicensis*) in coastal Louisiana
- Louisiana pinesnake research and monitoring.
- The West Indian manatee-sighting database was maintained and staff responded to stressed/dead manatees when reported.

ONGOING STATE WILDLIFE GRANTS PROJECTS

Zoological projects funded through State Wildlife Grants included:

- Monitoring Avian Productivity and Survivorship Program
- Tracking Prothonotary Warbler Migration and Effects of Winter Ecology on Breeding Success
- Breeding Bird Surveys
- Calcasieu Painted Crawfish Surveys
- Secretive Marsh Bird Callback Surveys
- Bald Eagle Nesting Surveys
- Aerial Surveys for Colonial Nesting Waterbirds
- Beach-nesting Bird Surveys
- Distribution, Abundance, Nesting and Movements of Reddish Egrets in Louisiana
- Multi-state Sandhills/Upland Longleaf Restoration Project
- Alligator Snapping Turtle Headstart Program
- Rare Amphibian and Reptile (SGCN) Surveys
- Statewide Passive Detection for Organismal Research Wildlife Tracking VHF Network

GOPHER TORTOISE

The gopher tortoise (*Gopherus polyphemus*) is state and federally listed as threatened in Louisiana. LNHP continues to collaborate with state, federal and nongovernmental partners within Louisiana and regionwide on the Gopher Tortoise Range-Wide Conservation Strategy to work towards species recovery by prioritizing and implementing action items and assessing threats to the species. LNHP staff participated in the gopher tortoise minimum viable population webinars and workshop to discuss previous and current efforts to determine how many minimum viable populations are needed rangewide to re-

***LEFT:** Louisiana pearlshell with its foot exposed as it searches for a new site to bury itself.*
***RIGHT:** Louisiana pearlshells trapped by the remains of an old bridge or dam in Black Creek in Grant Parish.*

***LEFT:** A female gopher tortoise still working on digging her home while her significant other has dug his burrow already, the same day they were released in the fifth constructed pen on Sandy Hollow WMA. **RIGHT:** A female gopher tortoise excited to explore her new home at Sandy Hollow WMA.*

An occupied juvenile gopher tortoise burrow found during camera scope surveys on Sandy Hollow WMA.

cover the species. LNHP is continuing to work on updating existing records and surveying new properties. Several areas on Sandy Hollow WMA north and south tracts were surveyed post-burn to increase detection of burrows and to assess tortoise populations and habitat conditions. This data was provided to LDWF Wildlife Division staff to assist with minimizing impacts during timber thinning and herbicide application on the WMA. LNHP staff continue to work in coordination with the LDWF Wildlife Division staff to prioritize and implement habitat restoration on Sandy Hollow WMA to provide optimal habitat for gopher tortoises, northern bobwhite and eastern wild turkey. . Approximately 35 acres of managed longleaf pine on Lee Memorial Forest in Washington Parish was surveyed, and three additional burrows were found and scoped with a burrow camera; one adult tortoise was detected.

LNHP staff prepared a Memorandum of Understanding between LDWF and Weyerhaeuser Company and coordinated and attended a field meeting Weyerhaeuser staff to facilitate prescribed burning activities on Ben's Creek property for habitat restoration efforts in Washington Parish. Plans were finalized to burn approximately 600 acres surrounding tortoise concentrations on Ben's Creek during 2019. We will continue to build partnerships with private landowners and timber companies to survey new properties and promote habitat restoration efforts to increase the amount of quality habitat for tortoises. Several grant proposals, including one multi-state, were prepared and submitted in FY 2017-2018 to attempt to acquire funding for tortoise surveys and habitat restoration. Land acquisition for gopher tortoise conservation remains a goal for this program, and coupled with habitat restoration, is critical to create a long-term viable population in Louisiana.

LNHP staff reviewed various development projects in Washington, St. Tammany and Tangipahoa parishes to assess potential gopher tortoise impacts and advised USFWS, LDWF staff and consultants on preventative measures as necessary.

LNHP continues to work with other states in the gopher tortoise's range as part of a "waif" tortoise working group to increase education and outreach to the public on the importance of not removing gopher tortoises from their natural habitat and notifying LDWF if they are found outside of their natural range. LNHP received four waif tortoises during FY 2017-2018 from Franklinton, Abita Springs, Mandeville and Metairie. Two of these tortoises (one female, one male) were released on the north tract of Sandy Hollow WMA in the fifth constructed release pen to-date. One blind female waif tortoise that was placed in a permanent home the previous fiscal year was euthanized by the LSU Vet School after her condition began to deteriorate and a health assessment was completed. An additional waif tortoise received the previous fiscal year that required a rear leg amputation was released in the fourth release pen during the spring of 2018. The remaining two waif tortoises (two females) showed clinical symptoms or tested positive for upper respiratory tract disease and will be placed in a permanent home.

LOUISIANA PINESNAKE

The Louisiana pinesnake (*Pituophis ruthveni*) was federally listed as a threatened species on April 6, 2018. LNHP, in coordination with federal partners, finalized a programmatic Candidate Conservation Agreement with Assurances for the Louisiana Pinesnake to promote forest management practices that increase suitable habitat to bolster pinesnake populations and are compatible with timber

A Louisiana pinesnake observed on private lands in Bienville Parish.

ABOVE: *View of Jones Brake habitat and release site for radio-tagged alligator snapping turtles in Columbia, Louisiana*
LEFT: *Alligator snapping turtle rescued from threat of vehicular traffic on Highway 165 in north-central Louisiana.*

harvest/production, and protect private landowners from future regulations due to the recent listing status. LNHP staff continue to be proactive in working with the timber industry to increase habitat quality by facilitating controlled burning through various grant programs.

Several federally funded monitoring and research projects are ongoing and aimed at providing information needed to aid in population recovery of the Louisiana pinesnake: use of camera traps to detect individuals, radio telemetry study to determine habitat preferences for released turtles, and reintroduction feasibility study. A total of three Louisiana pinesnakes (all females) were caught over 4,344 trap nights in FY 2017-2018, resulting in a catch per unit effort of 0.0007 or one snake for every 1,448 trap-nights. Traps are stationed at four sites: Sandy-Lands, Kepler Lake, Plantation and Hodges Garden. Only Sandy-Lands (2) and Plantation (1) detected Louisiana pinesnakes; their respective catch per unit efforts were 0.002 (one snake for every 508 trap-nights) and 0.0012 (one snake for every 835 trap-nights). As part of the Louisiana pinesnake reintroduction feasibility study, a total of eight Louisiana pinesnakes (two head-starts and six neonates) were released on the Catahoula District of the Kisatchie National Forest. In addition, nine previously released Louisiana pinesnakes were detected at the site utilizing Automated Pit Tag Readers and conventional trapping methods.

ALLIGATOR SNAPPING TURTLE

The alligator snapping turtle (*Macrochelys temminckii*) is listed as a SGCN; S3 in the Louisiana Wildlife Action Plan. A determination of whether or not to list the alligator snapping turtle as threatened under the Endangered Species Act is scheduled for 2020 by USFWS. Efforts are ongoing in Louisiana to gather sufficient data to preclude listing. During FY 2017-2018, collection of biometric samples (weight and carapace length/width) from the fourth cohort of alligator snapping turtles at the Monroe Fish Hatchery continued monthly during FY 2017-2018 to assess growth/health and a notable increase (range 18-35 percent) in body weight was observed. Twenty-three alligator snapping turtles were received from a private individual in Jeanerette, Louisiana, and biometric samples were taken. Ten alligator snapping turtles previously fitted with transmitters and released at Horseshoe Lake and Jones Brake on Boeuf WMA in 2016 were tracked in FY 2017-2018, all five turtles were found at Horseshoe Lake and only one was detected at Jones Brake.

DIAMOND-BACKED TERRAPIN

During FY 2017-2018, LNHP staff planned and coordinated with NOAA, CPRA, LDWF Fisheries and Media staff and private partners for release of 22 juvenile diamond-backed terrapin on Chenier Ronquille that were collected as eggs from nests during the previous fiscal year and otherwise would have been impacted by a restoration project on the barrier island or would have halted restoration progress. A site visit of the release area by LNHP staff and several partners was conducted prior to releasing the juveniles to observe the success of the restoration project and determine a suitable

LDWF staff releasing juvenile diamond-backed terrapins on Chenier Ronquille post-2010 Deepwater Horizon oil spill restoration efforts.

location for the release. Terrapins were also weighed, measured and marked prior to release. LNHP staff provided various interviews to several social media crews during and after the release process. LNHP staff also participated in live radio interviews to provide information on the species and the release effort and promote the importance of partnerships.

AMPHIBIAN AND REPTILE PROGRAM ACTIVITIES

The following amphibian and reptile program activities were completed during FY 2017-2018.

Louisiana Amphibian Monitoring Program

The Louisiana Amphibian Monitoring Program was initiated in 1996 as Louisiana joined dozens of states participating in the newly created USFWS - North American Amphibian Monitoring Program. The purpose of the program is to monitor anuran populations over time through frog calls detected at randomly selected sites. The Louisiana Amphibian Monitoring Program was initially coordinated by the Louisiana Department of Environmental Quality, with cooperative assistance from LDWF. State coordination transferred from personnel at the Louisiana Department of Environmental Quality to Loyola University, then to Kisatchie National Forest, and has remained with LDWF since 2005. In 2016 the Federal Government terminated the North American Amphibian Monitoring Program, and the LDWF state coordinator managed route assignments and data collection until Louisiana Amphibian Monitoring Program sponsorship was formally implemented by LDWF in 2017. Late in 2017 all North American Amphibian Monitoring Program data files for Louisiana were transferred to the LDWF Data Management System. As of completion of the 2017 field season, the Data Management System contains call and weather data for 1,279 route runs. Authorized directives are to create a public page for the Louisiana Amphibian Monitoring Program on the LDWF website, and to enable access to Data Management System data for established Louisiana Amphibian Monitoring Program volunteers.

Restricted Snakes

Act 1221 of the 2005 Louisiana Legislative Session required LDWF to adopt rules regarding possession of venomous snakes and large constrictors. Those rules, now RS 76.101.K, include a permit system (Restricted Snake Permit) whereby Louisiana residents, or non-residents who bring restricted snakes to Louisiana may conditionally possess such snakes. Restricted snakes must be kept under secure conditions, and those interested in possessing venomous snakes must demonstrate prior experience in maintaining them in captivity. Permittees are subject to inspection of facilities by LDWF personnel, and as of 2017 must provide digital images of their facilities as well as an inventory of their restricted snakes. During FY 2017-2018, 52 individuals received renewed permits for 2018, and 17 others applied for and received permits.

Turtles

There are 27 native turtle species in Louisiana and its coastal waters. Seven of the species are protected under the Endangered Species Act, and four others cannot be taken for commercial purposes through regulatory act (RS 76.101.G). The remaining 16 species may be taken for commercial and recreational use. Monitoring commercial take of turtles was facilitated by Act 114 of the 2016 legislative session, which added amphibians and reptiles to the Trip Ticket system. According to Trip Ticket sales, the following turtles were harvested for commerce during FY 2017-2018:

- Common Snapping Turtle - 115
- Mississippi Mud Turtle - 6
- Red-eared Slider - 3,409
- Spiny Softshell - 146

Turtle commerce was also monitored from export data provided by the USFWS Law Enforcement Management System. The USFWS Law Enforcement Management System data do not permit an accurate source of harvest data because they report exporter name vs. state of origin, and use a "W" (wild) source code for many turtles that are hatched on farms. The USFWS Law Enforcement Management System data do deliver data on trends in demand and export prices for each species, which are valuable in forecasting demand of wild-caught turtles to supply reptile collectors and turtle farmers. Recent demand for mud and musk turtles has resulted in conflict of interest between turtle collectors, who export adult turtles, and turtle farmers, who export farmed hatchlings. During the 2018 Regular Legislative Session, turtle farmers were able to get a bill introduced to the House of Representatives that would have excluded turtle collectors from exporting common musk turtles (stinkpots). The bill was not advanced, nor voted upon.

Field Work

Sixteen herpetofaunal surveys were conducted on private lands, two surveys on BREC park properties, one on federal lands, five on WMAs/LDWF sites, three surveys on LSU lands, two in miscellaneous public and four in state parks. One hundred seventeen incidental surveys and observations were also made. Observed were 66 species (45 percent of the species in the state) and 1,093 individual amphibians and reptiles (*Table 3*).

WEST INDIAN MANATEE

The West Indian manatee (*Trichechus manatus*) is a transient species in Louisiana and occasionally travels from Florida to Louisiana during the summer months when water temperatures are warmer and should be en route returning to Florida by October when

Manatee caution sign posted at major boat launches throughout southern and coastal Louisiana with the LDWF 24-hour hotline number listed to encourage sighting reports.

TABLE 3. **Species of Greatest Conservation Need are in* ***bold font***

Species Observed	# Observed	Species Observed	# Observed	Species Observed	# Observed
Amphiuma means	**1**	*Rana catesbeiana*	23	*Plestiodon laticeps*	6
Amphiuma tridactylum	1	*Rana clamitans*	113	*Farancia abacura*	2
Ambystoma maculatum	eggs	*Rana sphenocephala*	15	***Farancia erytrogramma***	1
Ambystoma opacum	2	*Gastrophryne carolinensis*	19	*Diadophis punctatus*	4
Ambystoma talpoideum	1	*Alligator mississippiensis*	40	*Nerodia cyclopion*	6
Desmognathus conanti	**5**	*Chelydra serpentina*	1	*Nerodia erythrogaster*	3
Eurycea guttolineata	7	***Macrochelys temminckii***	1	*Nerodia fasciata*	25
Eurycea quadridigitata	2	*Kinosternon subrubrum*	5	*Nerodia rhombifer*	56
Plethodon mississippi	2	*Sternotherus odoratus*	7	*Regina grahamii*	1
Bufo fowleri	15	***Deirochelys reticularia***	2	*Liodytes rigida*	2
Bufo nebulifer	45	*Graptemys pseudogeographica*	1	*Storeria dekayi*	12
Bufo terrestris	2	*Pseudemys concinna*	6	*Storeria occipitomaculata*	1
Acris blanchardi	**1**	*Terrapene carolina*	13	*Thamnophis proximus*	16
Acris crepitans	19	*Trachemys scripta*	142	*Thamnophis sirtalis*	3
Acris gryllus	16	*Apalone spinifera*	4	*Opheodrys aestivus*	2
Hyla chrysoscelis	8	*Hemidactylus turcicus*	50	*Coluber constrictor*	31
Hyla cinerea	5	*Anolis carolinensis*	81	*Pantherophis guttatus*	5
Hyla squirella	40	*Anolis sagrei*	2	*Pantherophis spiloides*	7
Pseudacris crucifer	1	*Sceloporus consobrinus*	6	*Lampropeltis nigra*	9
Pseudacris fouquettei	1	*Scincella lateralis*	115	*Agkistrodon contortrix*	2
Eleutherodactylus cystignathoides	8	*Plestiodon fasciatus*	36	*Agkistrodon piscivorus*	17
Eleutherodactylus planirostris	10	*Plestiodon inexpectatus*	5	***Crotalus horridus***	3

water temperatures begin to decline in Louisiana. LNHP staff continue to coordinate with USGS, USFWS, Florida Fish and Wildlife Conservation Commission, Alabama Department of Natural Resources, Dauphin Island Sea Lab, Audubon Zoo, and Texas Parks and Wildlife staff for information exchange on manatee sightings across the range, especially during the cold weather season. Manatees reported traveling through Louisiana, citizen concerns and location of warm water sources were assessed. Fortunately, no injured or dead manatees were reported during FY 2017-2018. LNHP staff continue to document sightings provided by LDWF staff and the public, and update the database; 10 sightings total for the current reporting period (six in St. Tammany Parish along the Mandeville Lakefront, Bayou Bonfouca, Bayou Lacombe and Beau Chene Marina [five adults and one juvenile]; two adults in Cameron Parish along the Cameron Ship Channel and Rockefeller Refuge; one adult Terrebonne Parish at Pointe au Chenes WMA; and one adult in Livingston Parish along the Amite River). Manatee caution signs were purchased through a federally funded grant and were posted by LNHP staff at all major boat launches throughout coastal Louisiana from the Texax border to the Mississippi border. These signs provide the LDWF 24-hour dispatch number to assist and encourage folks to report manatee sightings as well as possibly injured or deceased manatees.

NONGAME BIRD ACTIVITIES

Louisiana's avifauna is diverse, encompassing more than 480 species. Over 400 of these species are nongame and fall under the responsibilities of the LNHP. LNHP is responsible for facilitating and directing research, monitoring and conservation actions for all nongame birds in our state, as well as providing peer-review for scientific and layman products. The bulk of the responsibilities involve coordinating or participating in scaled-down monitoring that feeds into regional, national or international datasets. Surveys include USGS Breeding Bird Surveys, Christmas Bird Counts, International Piping Plover Censuses, Secretive Marsh Bird Callback Surveys, Waterbird Nesting Colony Surveys, Buff-breasted Sandpiper Surveys, Bald Eagle Nesting Surveys, the Institute for Bird Populations' Monitoring Avian Productivity and Survivorship Program, Bird Studies Canada Motus Wildlife Tracking System Network, and others. Geographically expansive and long-term bird projects, crucial for the conservation and management of these species, have benefitted greatly from LDWF's financial commitment to nongame birds and have been matched by generous support from ConocoPhillips, the Louisiana Wildlife and Fisheries Foundation, Barataria-Terrebonne National Estuary Program, and federal aid grant opportunities such as Section 6 funds and the State Wildlife Grants Program. In fact, State Wildlife Grants have contributed, in part, to the majority of the projects previously mentioned; and with such funding, almost 80 percent of USGS Breeding Bird Survey routes in Louisiana were assigned to active observers in the 2018 season. LNHP biologists documented many rare birds, which were submitted for verification and inclusion into national datasets including eBird, thereby contributing to the ever-evolving understanding of bird status and distribution in Louisiana. Highlights during this period include a pair of nesting crested caracaras, several white-tailed kites, two white-tailed hawks, a Harris' hawk, a nesting colony of cave swallows, a Say's phoebe, six vermilion flycatchers, and a plethora of out-of-season records. During Christmas Bird Counts, LNHP

biologists tallied more than 83,000 individual birds of 129 species and observed 12 state-rare crested caracaras, 22 bald eagles, more than 35,000 snow geese, a wintering summer tanager, and a Franklin's gull. LDWF's White Lake Wetlands Conservation Area Christmas Bird Count was attended by 15 surveyors, who tallied more than 150,000 birds of more than 140 species. These and results from other Christmas Bird Counts in the region continue to highlight the critical need of preserving rice cultivation and culture for both the human and bird communities of the region. Bird occurrence data were also used to assist in the development of lists of SGCN on WMAs, as well as to inform USFWS Species Status Assessments.

Statewide Passive Detection for Organismal Research (SPDOR) VHF Network

Funded by ConocoPhillips, the Louisiana Wildlife and Fisheries Foundation, Barataria-Terrebonne National Estuary Program, and LDWF's Rockefeller Trust, the SPDOR VHF Network entered its third year. This passive network will facilitate radio tracking of hundreds of organisms at once provided those organisms are first fitted with nanotags (tiny, coded radio tags) then move through the approximately 9-mile detection radius of at least one receiver station. The potential for such a network of stations to contribute to our current knowledge level of SGCN is substantial and is identified as a strategy for the conservation of landbirds in the Louisiana Wildlife Action Plan (Holcomb et al. 2015). In addition, this network contributes to the projects of many other scientists currently utilizing Bird Studies Canada Motus Wildlife Tracking System. In fact, our coastal network of receiver stations have detected more than 175 individual research birds of at least 15 species including several Neotropical migratory landbirds, a nightjar, a seabird and several shorebird species, one of which is federally listed as threatened (red knot). This work has almost limitless potential for collaborating with other agencies, industry, nonprofits, academia, and others from across the Western Hemisphere. As of June 2018, SPDOR VHF receiver stations were active at the Grand Isle Marine Lab Facility, Pointe-Aux-Chenes WMA, Pass-A-Loutre WMA, Sabine National Wildlife Refuge, Rockefeller Wildlife Refuge East and West, a private property north of Rockefeller Wildlife Refuge, and Baton Rouge Audubon Society's Peveto Woods Sanctuary in Cameron Parish, with additional Barataria-Terrebonne National Estuary Program receiver stations at East Timbalier Island, Port Fourchon, Grand Isle, and East Grand Terre Island. Thanks to the generous conservation grant from ConocoPhillips, we will be able to install a total of 30 or more VHF receiver stations, effectively creating a digital net encompassing Louisiana's entire coastline. A press release documenting ConocoPhillips' contribution and the state of the project was published by several media outlets.

Bald Eagle Nest Surveys

Staff performed aerial surveys for nesting bald eagles in the winter of 2017-2018. The bald eagle, formerly a species in precipitous decline due to persecution and contaminants, was removed from the federal Endangered Species List in August 2007, and the species continues to increase in our state and elsewhere. Nevertheless, nesting activity and productivity of bald eagles may be an excellent indicator of environmental health, and nesting success must be monitored to ensure population viability. Composed of all nests known to be active (i.e., with eggs, chicks, incubating adult, etc.) at least once from 2008-2017, a list frame was developed that directed nest-to-nest surveys via helicopter. Staff surveyed 599 nests in southeast Louisiana for activity; 264 of those nests were active during the 2017-2018 eagle nesting season. LNHP staff recorded the nest status, nesting substrate, number of eggs, number and age of chicks, etc., for each surveyed nest, where applicable, during this activity survey. A follow-up survey of a subset of nests occurred in March 2018, which yielded productivity data

LEFT: *The first documented limpkins in Louisiana were discovered by birders in FY 2017-2018. The species is particularly fond of apple snails.*
BELOW LEFT: *Bald eagles are winter nesters in Louisiana, which makes their nests even more of a spectacle.*
BELOW RIGHT: *American avocets are large shorebirds typically found along the Louisiana coast in nonbreeding season.*

***LEFT:** Live steno stranded on Grand Isle Beach. **RIGHT:** Risso's dolphin stranded on Grand Isle Beach.*

for 70 nests. Based on these data, nest success was 95-97 percent with an average of 1.3 eaglets produced per nest or approximately 330 eaglets successfully fledged during the 2017-2018 nesting season. About 98 percent of nests were built in bald cypress; one-percent were in other tree species (live oak and black willow) and 1 percent were on man-made structures like power pylons.

Scientific Research and Collecting Permits and Other Permits

Scientific Research and Collecting Permits, Eagle Nest Take Permits and Interstate Bird Travel Permits are also housed within LNHP. Scientific Research and Collecting Permits are utilized by many researchers from bird banders to mussel surveyors. During FY 2017-2018, 93 Scientific Research and Collecting Permits were issued to academic institutions, museums, consultants, private individuals and others. Interstate Bird Travel Permits are issued to those bringing wild (otherwise, protected, migratory) birds into the state for educational demonstrations; one such permit letter was issued during this period. Eagle Nest Take Permits are issued on very rare occasions - when nests are in dangerous locations for birds or the public - and the removal must be mitigated. No permit was issued for eagle nest take this period.

MARINE MAMMAL AND SEA TURTLE STRANDING AND RESPONSE PROGRAM

The LDWF Marine Mammal and Sea Turtle Stranding and Rescue Program is the lead marine mammal and sea turtle stranding and rescue response organization in Louisiana. The program continues to receive and investigate all reports of live and dead marine mammals and sea turtles. LDWF biologists work closely with our federal counterparts and staff at NOAA - National Marine Fisheries Service (NMFS) and USFWS to investigate the cause of strandings and deaths, following established protocols for consistency in data collection to provide standard and accurate data. During FY 2017-2018, all sea turtle carcasses were recovered for a necropsy to be performed. Where logistically possible and appropriate, marine mammal carcasses are also recovered for necropsies or are necropsied in the field. LDWF works with the LSU School of Veterinary Medicine (LSUSVM): Louisiana Animal Disease Diagnostics Laboratory to utilize their BSL-3 Laboratory to perform necropsies on marine mammals, and many necropsies have been performed utilizing this state of the art facility. In August 2017, LDWF hosted the NOAA Sea Turtle Veterinarian at LSU to conduct a batch sea turtle necropsy training session. LDWF staff from field offices across the coast, as well as representatives from LSUSVM, participated in the lab-based training.

LDWF staff conduct beach surveys where accessible to continue to monitor beaches conducting active surveillance searching for any stranded animals. All encountered strandings are sampled accordingly following protocols. Beach surveys are conducted where staff can access beaches with state equipment such as 4x4 trucks or UTVs, and in remote locations where reports may go undetected by the public. LDWF has also built relationships with others working in coastal areas including coastal restoration contractors, local municipalities patrolling beaches, Foundation Property Managers and others who may cover sections of beaches routinely to report any strandings observed. It is through these developed and fostered relationships that we receive stranding reports in a timely fashion and cover certain beaches along the coast of Louisiana more frequently than may have been done so in the past.

Between July 1, 2017 and June 30, 2018, 41 marine mammal strandings (including a live neonate dolphin, a live rough-toothed dolphin and a live pygmy sperm whale) and 40 sea turtle strandings (including a live green sea turtle that was later released, a live Kemp's ridley post hatchling that washed up on Grand Isle Beach following a storm, and a live sub-adult loggerhead sea turtle that was found on Grand Isle Beach), have been covered. Marine mammal species included common bottlenose dolphins (*Tursiops truncatus*), pygmy sperm whale (*Kogia breviceps*),

melonheaded whale (*Peponocephala electra*), sperm whale (*Physeter macrocephalus*), rough-toothed dolphin (*Steno bredanensis*), and a Risso's dolphin (*Grampus griseus*).

Marine Mammal and Sea Turtle Projects

Live Sea Turtle Captures

Louisiana nearshore habitat provides resources necessary to foraging sea turtles; however, little is known regarding sea turtles off the coast of Louisiana. Determining distribution, seasonal movements, growth rates and habitat use for all life stages of marine turtles has been identified by the USFWS and NMFS as a major action required to achieve recovery for these endangered species. However, currently, no programs exist to research and monitor these turtle assemblages via in-water efforts in Louisiana waters. Without baseline information identifying critical habitat and use of these habitats by turtles, proper management and recovery of these threatened and endangered species cannot occur. Since December 2014, LDWF has collaborated with researchers from USGS to initiate a long-term mark recapture survey of live sea turtles in Louisiana occurring each December and May. In FY 2017-2018, LDWF assisted with live sea turtle capture efforts in December 2017 and May 2018 where at total of 12 green sea turtles were captured. A total of 108 individual sea turtles were captured, including 106 green sea turtles, one sub-adult/adult loggerhead sea turtle, and one Kemp's Ridley sea turtle that was captured nearby as part of a relocation trawling project while the sampling crew was in the area. Sea turtles are captured (NMFS Permit Number 17307-03) and temporarily held for sample collection including skin biopsies, a carapace biopsy and blood samples. In addition, all turtles captured are scanned to determine if any tags exist. If no tags exist, all individuals receive external flipper tags (small metal tags on both front flippers) and an internal Passive Integrated Transponder tag. LDWF staff will continue to work with fellow sea turtle researchers at USGS. Support for these efforts for LDWF expenditures came from a grant awarded by the Fourchon Oilman's Association in conjunction with the Bayou Community Foundation to the Louisiana Wildlife and Fisheries Foundation. With limited data available for these species found along the coast of Louisiana, it is vitally important to invest in efforts with collaborators such as our partners at USGS to evaluate the numbers of sea turtles by species, and the areas they may be found at certain life stages, in order to fill data gaps and adopt protective measures to preserve these imperiled species.

Barataria Bay Dolphin Projects

In September 2017, live dolphin health assessments focusing on reproductive health of dolphins in Barataria Bay were performed. As part of a Gulf of Mexico Research Initiative funded project, LDWF collaborated with the National Marine Mammal Foundation and NOAA for this project. Dolphins were captured and temporarily restrained for a suite of health parameters to be recorded and received an ultrasound. Female dolphins were assessed via ultrasound to determine if they were pregnant or not, and if they were pregnant, the ultrasound was utilized to determine expected due dates for the fetus based off of skull diameter measurements. These individuals were outfitted with a satellite linked tracking tag attached to the dorsal fin to determine which areas of the bay they primarily utilized in order to relocate them in the future. Each captured animal is freeze-ebranded on the dorsal fin, to aid in identification purposes for follow-up monitoring surveys. Reproductive Outcomes Surveys were performed by LDWF, National Marine Mammal Foundation and NOAA staff in May, June and July 2018 in order to determine if the pregnancy was a success or failure. The target animals, known as pregnant females, are searched for in Barataria Bay based off of satellite linked tracking tags historical informa-

***LEFT:** Live loggerhead sea turtle. **RIGHT:** Sperm whale stranding on Grand Isle Beach*

tion after their expected due date, and are observed to determine if a neonate, or baby dolphin, is surfacing with the mother. The animals are photographed for further documentation and tracking purposes. Including captures performed in September 2017 where 22 animals were captured, a total of 168 dolphins (145 individuals) have been captured since these efforts began in 2011. Field work such as these efforts provide further networking opportunities for our staff with experts from across the country and world, as well as provide hands-on live dolphin handling experience that simply cannot be overlooked.

LNHP SCIENTIFIC CONFERENCE PRESENTATIONS

A Species on the Periphery: The Status and Importance of Gopher Tortoise Conservation in Louisiana. LDWF Research and Management Symposium, Baton Rouge, LA, June 2018.

Louisiana's Gopher Tortoise Status. The 339th Annual Gopher Tortoise Council Meeting. Aiken, SC. October 2017

Statewide Passive Detection for Organismal Research VHF Network. Oral. State of the Coast annual conference. New Orleans, LA. May 2018.

Reid, C. S., C. Doffitt, B.S. Early. June 4, 2018. Louisiana Department of Wildlife and Fisheries 2018 Research and Management Symposium. Woody Brush Control on Coastal Prairies in Southwest Louisiana. Poster Presentation.

Early, B.S. July 7, 2017. Coastal Prairie Partnership, Coastal Prairie Conservation Symposium. Cajun Prairie &Prescribed Fire on Urban Landscape.

OIL SPILL PROGRAM

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OVERVIEW

LDWF's Oil Spill Program's principal goal is the defensible documentation of biological and ecological impacts associated with oil spills and the implementation of commiserate restoration of these same resources for the citizens of Louisiana. The program consists of three programmatic facets: Response, Assessment and Restoration. When utilized collectively, these programmatic facets culminate in the accomplishment of our program's principal goal. LDWF's consistent and dedicated efforts within the 2010 *Deepwater Horizon* oil spill clearly Illustrate this relationship. In that, LDWF personnel collected invaluable response information throughout the incident, played a critical role in determining resource injury, and now play an instrumental role in coastal habitat restoration. For FY 2017-2018, our program, in concert with LDWF personnel, worked on the following 2010 *Deepwater Horizon* oil spill restoration activities:

1. Engineering and design for two of the state's historical colonial waterbird colonies (i.e., Queen Bess and Rabbit islands).
2. Addressing critical informational needs to facilitate the documentation of resource uplift (e.g., nests generated) in association with colonial waterbird colony restoration.
3. Engineering and design for recreational-use projects in association with LDWF WMAs and state parks.

Pooled oil escaping containment adjacent to LDWF's Three Rivers WMA.

Collectively, these activities were accomplished in large part through strong collaborations amongst LDWF programs and the Louisiana and Regionwide Technical Implementation Groups; the principal means by which state and federal trustees implement 2010 *Deepwater Horizon* oil spill restoration within the state of Louisiana and the broader northern Gulf of Mexico.

RESPONSE

LDWF's Oil Spill Program monitors and responds to reports of oil spills throughout Louisiana. During FY 2017-2018 our program received 10,755 oil spill reports from the principal reporting agencies, National Response Center and Louisiana State Police. These reports encompass a broad array of potential situations where volume reported may not be indicative of the overall resource injury. Program personnel carefully reviewed each of these reports so as to assess potential impacts to the state's wildlife and sensitive habitats.

***LEFT:** Sequestered oil being manually removed in proximity of LDWF's White Lake Wetlands Conservation Area. **RIGHT:** Pooled oil documented from a production facility within Kent Bayou.*

Of these spill reports, LDWF's Oil Spill Program performed 23 site investigations based on available information and risk to natural resources. Many of these spills required multiple and detailed site visits over several months to ensure complete injury documentation and cleanup oversight. Personnel led by Program Response Lead Laura Carver performed regimented evaluations of injury to wildlife and associated habitats. Personnel documented and recovered live, oiled wildlife for rehabilitation and subsequent release as well as wildlife killed during the incident. Of note, several spills required extensive assistance from select LDWF Office of Wildlife (Coastal and Nongame Resources and Wildlife Divisions) and Office of Fisheries personnel certified in Hazardous Waste Operations and Emergency Response (HAZWOPER).

REPRESENTATIVE SPILLS (FY 2017-2018)

The spills listed in *Table 4* and other spills presented many unique challenges during FY 2017-2018. LDWF's ability to effectively and safely engage on these and other spill-related issues stems from a commitment that personnel maintain HAZWOPER certification and reinforcing these training principles among partner agencies (e.g., Unified Response Drills and Planning Sessions). Collectively, this as well as stepwise implementation of wildlife response activities has been memorialized within LDWF's Oiled Wildlife Response Plan (overview below). In total, wildlife and habitat information generated from LDWF Oil Spill Program's response activities continues to be an invaluable resource for state and federal trustees towards developing preassessment and/or Natural Resource Damage Assessment (NRDA) processes as well as scaling future restoration activities.

LOUISIANA OILED WILDLIFE RESPONSE PLAN

The plan memorializes LDWF's wildlife response procedures in a stepwise progression to guide responders in the correct and safe means to implement these activities throughout the state. Significant time is dedicated to highlighting the importance of evaluating spill notifications (Sources: National Response Center and Louisiana State Police) utilizing established decision criteria. Information gained during this time-sensitive period can be critical in determining potential threat(s) to wildlife, fisheries and/or sensitive habitats. In addition, the plan identifies principal trustee agencies as well as their inherent resource responsibilities, should LDWF require additional information. Based on information received in the initial report and through follow up discussions with the Louisiana Oil Spill Coordinator's Office, LDWF may implement a site visit to further assess the potential injury extent and coordinate

***LEFT:** Oiled American alligator documented within Kent Bayou spill. **RIGHT:** Pooled oil documented within bottomland hardwood forest adjacent to LDWF's Three Rivers WMA.*

TABLE 4. *Representative Spills (FY 2017-2018)*

NRC & LSP	LOCATION	PARISH	RESPONSIBLE PARTY	OVERVIEW
NRC#1183559	Merryville	Beauregard	Texegy Operating LLC	Incident was initially reported (07/11/17) as the release of ~80bbls of crude oil (later recalculated to 102bbls) along one of their pipelines.
NRC#1185209	Evangeline	Acadia	2 Bayous Inc.	Incident was initially reported (07/26/17) as the release of ~150bbls of crude oil from within one of their tank batteries.
NRC#1186031	Forked Island	Vermilion	Harvest Pipeline	This incident was reported (08/02/2017) as the release of ~5bbls of oil condensate from an 8", subsurface pipeline.
NRC#1187303	Larose	Lafourche	Mesa Gulf Coast	This incident was reported (08/15/2017) as the release of no more than 2bbls of crude oil released from a pipeline.
NRC#1187675	Bayou Bouef	Rapides and Avoyelles	White Oak Operating	This Incident was reported (08/18/2017) as the release of ~100bbls of crude oil from a secondary containment area that contains three storage tanks.
NRC#1188673	Chacahoula	Terrebonne	Glassell Producing	This incident was reported (08/29/2017) as the release of ~5bbls of crude oil from a storage tank.
NRC#1192154	Cox Bay	Plaquemines	XTO Energy	This incident was initially reported (10/03/2017 as the release of ~2bbls of crude oil and later recalculated to be ~8bbls.
NRC#1192801	Lake Washington	Plaquemines	Hilcorp	This incident was reported (10/10/17) as the release of ~30bbls of crude oil/water mix from one of their wells.
LSP#17-04700	Slocum	Concordia	Rabb Contracting	This incident was reported (10/12/17) as the release of ~6 bbls of crude oil (volume estimation based on production values) from a poly flow-line.
NRC#1193489 NRC#1192728	Lake Pagie	Terrebonne	TPIC	This incident was initially reported (10/9/17) as the release of "2 teaspoons" of natural gas condensate from a 3" flowline. · An additional natural gas condensate release (~5 bbls) was reported as an "update" to the existing NRC report (10/17/17). · An *in-situ* burn was implemented (11/8/17).
NRC#1197934	Point A La Hache	Plaquemines	XTO Energy	This incident was reported (11/23/17) as the release of ~40bbls of crude oil into the adjacent marsh encompassing three interior ponds. · An *in-situ* burn was implemented on 12/1/17.
NRC#1200926 LSP#18-00021	White Lake WCA	Vermilion	TPIC	This incident was reported (1/02/2018) as a condensate spill and was the result of a ruptured flowline that was connected to an out of service wellhead.
NRC#1201300 LSP#18-00133	Weeks Island	Iberia	TPIC	This incident was initially reported (1/8/2018) as the release of ~10 bbls of crude oil from a pinhole leak in a 3" flowline. The release volume was later refined to 5 bbls.
NRC#1201871 LSP#18-00240 LSP#18-00272	PALWMA Garden Island Bay	Plaquemines	Whitney Oil and Gas	This incident was reported (1/13/2018) as the release of 3 bbls of crude oil from a storage tank onto LDWF's Pass-a-Loutre WMA.
NRC#1202746 NRC#1202800 LSP#18-00453 LSP#18-00484	Adjacent to PACWMA Bully Camp	Terrebonne and Lafourche	Red Rock Energy	This incident was reported (1/24/2018) by a third party that witnessed a sheen originating from the Red Rock facility which is adjacent to LDWF's Pointe-Aux-Chenes WMA.
NRC#1204311 LSP#18-00769	Kent Bayou	Terrebonne	Forza Operating	This incident was reported (02/14/2018) as the release of ~20 bbls of crude oil into a canal and associated marsh habitats (impact area: ~¼ mile of shoreline).
NRC#1207469 LSP#18-01348	Adjacent to Three Rivers WMA Vidalia	Concordia	Gage Energy	This incident was initially reported (3/20/2018) as the release of ~2-3 bbls of crude oil.
NRC#1208362	Bay Jacques	Plaquemines	Summit Oil & Gas	This incident was reported (4/3/18) as a leaking storage tank that released ~100 bbls of crude oil into the canals surrounding the facility.
NRC#1209141 LSP#18-01719	MS River (MM-101 to MM-91)	Orleans	MV Pac Antares Gallagher Marine	This incident was initially reported (4/12/2018) as a ~100-barrel release of heavy fuel oil from a damaged vessel.
NRC#1210019	MS River	Orleans	MV Iver Exporter	This incident was initially reported (4/23/18) as a ~100-barrel release of heavy fuel oil. The cause of this Incident was determined to be a leaking fuel tank in which released oil collected within the vessel's ballast tanks.
NRC#1211851 LSP#18-02200	Lake Dauterive	St. Martin	BCF Resources	This incident was reported (5/11/18) as the release of ~3-5 bbls of crude oil from a platform flowline impacting surface waters.
NRC#1214530 LSP#18-02627	PALWMA Garden Island Bay	Plaquemines	Whitney Oil and Gas	This incident was reported (6/7/2018) as the release of ~1.75 barrels of crude oil from a flowline at Whitney's tank battery 49 location.
NRC#1215044 LSP#18-02708	Timbalier Bay	Terrebonne	S2 Energy	This incident was reported (6/12/2018) as the release of an unknown amount of crude oil associated with a leaking well casing.
LSP#18-02745	White Castle	Iberville	JP Oil Company Inc.	This incident was reported (6/13/2018) as the release of ~4-5 barrels of crude oil from an abandoned and rotted flow line.

with responders on appropriate cleanup metrics and countermeasures, as needed. The plan identifies current means by which LDWF collects information and regularly stresses the need for responders to complete and submit all relevant paperwork under established Chain of Custody procedures. Coordination amongst the parties during an active response is accomplished through the Unified Command, an organizational structure built on the widely accepted incident Command System which can be scaled to the appropriate size and nature of each incident. The Unified Command represents the principal platform to inject and receive relevant information about or within each incident. Should injured wildlife be encountered in association with the incident, LDWF may request the Unified Command to establish a Wildlife Rehabilitation Unit to provide care for live, oiled wildlife, as well as provide an interim evidence freezer for carcasses. At the conclusion of the incident, the Wildlife Rehabilitation Unit lead turns over all original paperwork, carcasses, etc., and LDWF terminates response activities utilizing established criteria. To date, the plan has been submitted to LDWF administration for review/comment.

PREASSESSMENT AND NRDA ACTIVITIES

Within FY 2017-2018, LDWF's Oil Spill Program continues to make concerted efforts involving case management of current and legacy NRDA cases.

CASE MANAGEMENT OF CURRENT AND LEGACY NRDA CASES

Program personnel spent extensive time and effort engaging with state and federal trustees on nine current and legacy (i.e., incident occurred greater than 10 years ago) pre-assessment and NRDA case activities (*Table 5*). Much of these activities involved detailed data review (e.g., response and pre-assessment information) and technical resource analyses (e.g., Habitat Equivalency and Resource Equivalency Analyses) to quantify resource injury extent, as well as scale representative restoration.

DEEPWATER HORIZON

Overview: During the 2010 *Deepwater Horizon* oil spill, approximately 134 million barrels of oil and other substances were released into the Gulf of Mexico. Many of Louisiana's coastal islands provide important habitat for threatened and endangered bird species and species of concern (e.g., brown pelican [*Pelecanus occidentalis*], piping plover [*Charadrius melodus*], least tern [*Sternula antillarum*], black skimmer [*Rynchops niger*], and American oystercatcher [*Haematopus palliates*]). Due to the severity of the spill-related bird injury, Louisiana factors prominently ($148.5 million) in its ability to restore for these injured resources. To that end, one of Louisiana's principal goals is the restoration of the state's historical colonial waterbird colonies, a restoration approach emphasized within the Programmatic Damage Assessment and Restoration Plan and the Strategic Framework for Bird Restoration Activities.

Within FY 2017-2018, our program's activities centered around developing restoration plans for two of the state's historical colonial waterbird colonies: Queen Bess and Rabbit islands. These restoration efforts are intended to create highly productive and structurally enduring bird habitats (e.g., increased nest productivity, expanded habitat utilization, etc.).

ONGOING RESTORATION PROJECTS

Queen Bess Island

Queen Bess Island has a rich and diverse history. LDWF utilized the island as one of its principal reintroduction localities for brown pelican, a species that was once extirpated from the state. Today, the island ranks as the third most productive breeding colony for the species, as well as providing critical historic nesting habitat for over 60 bird species. That stated, this island experienced expansive and repeated oiling events during the 2010 *Deepwater Horizon* oil spill, and significant direct and indirect bird losses and habitat damage associated with response activities. To that point, the island has less than 5 acres of suitable colonial waterbird nesting and brood-rearing habitat remaining. As such, restoration of Queen Bess Island was prioritized by LDWF within Louisiana Trustee Implementation Group Restoration Plan #1: Restoration of Wetlands, Coastal and Nearshore Habitats; Habitat Projects on Federally Managed Lands; and Birds (October 2016).

LDWF actively participated in all engineering and design activities towards the eventual development/selection of the Preferred Design Alternative (Design Alternative 2B). The design will create 30 acres of brown pelican habitat and 7 acres of tern and skimmer habitat (*Figure 1*). This would be accomplished by filling the existing open water cell (Cell 3) and gradually sloping fill material through Cell 2 from west to east. The marsh nourishment would occur in Cell 1, which would leave this cell immediately available for colonial waterbird nesting and brood-rearing habitat following construction. In Cell 3, an approximately 7-acre elevated platform of crushed limestone (6 inches deep) would be created for nesting terns and skimmers. Limestone would be placed over geotextile fabric to reduce the potential for vegetation growth. In addition, herbicide application would be applied in the spring (prior to bird nesting season) and fall (after the conclusion of the bird nesting season) to maintain optimal tern and skimmer habitat.

The Preferred Design Alternative allows for a variety of vegetation growth and nesting substrate options for colonial waterbirds, including an upland, unvegetated tern/skimmer habitat platform in Cell 3, areas supporting

TABLE 5. *NRDA Assessment Case Summary*

CURRENT	LEGACY	SETTLED	RESTORATION ACTIVITIES
Sunoco Logistics Milepost 51.1 & Hilcorp Bay St. Elaine Status: Settlement Discussions	ACL Gretna-MS River / DM-932, Citgo Calcasieu River, & ExxonMobil Torbert Status: Settlement Discussions	Shell Glider $3,871,169.54	LWMIWCB Status: Approved Restoration Plan
Hilcorp Bay Long & Gage Energy 3 Rivers WMA Status: Injury Assessment	Whitney Oil & Gas Garden Island Bay Area of Concern (AOC) Status: Remediation Planning and Permitting	Hess Breton Island $ 8,723,394.88	Hilcorp Duck Lake & Unocal Lake Palourde Status: Review of Project Monitoring and Corrective Actions
	Shell Joseph's Bayou I & II, Taylor Energy MC20 & Hurricanes Katrina and Rita Status: Pending		

marsh shrub growth in Cells 2 and 3, and black mangrove [*Avicennia germinans*] and marsh grasses in Cell 1. Plantings of appropriate native vegetation species would occur within all cells. Cell 1 would reach elevations within the higher intertidal range during approximately the first two years of the project lifespan. A tidal exchange point would be created in Cell 1 to promote or enhance fish access within this cell. Breakwaters would be installed on the island's northeast side to reduce potential scour associated with the tidal exchange point and the southwest side to dissipate wave energy, which would thereby provide young colonial waterbirds with a calm water environment. Design Alternative 2B includes up to 21 bird ramps placed approximately every 250 feet at an approximate 3:1 slope to facilitate young birds' access to water around the island.

Proposed Timeline

Based on current (end of 2018) scheduling, the Queen Bess Island Restoration Project will initiate construction in August or September 2019.

Nesting brown pelicans on Queen Bess Island.

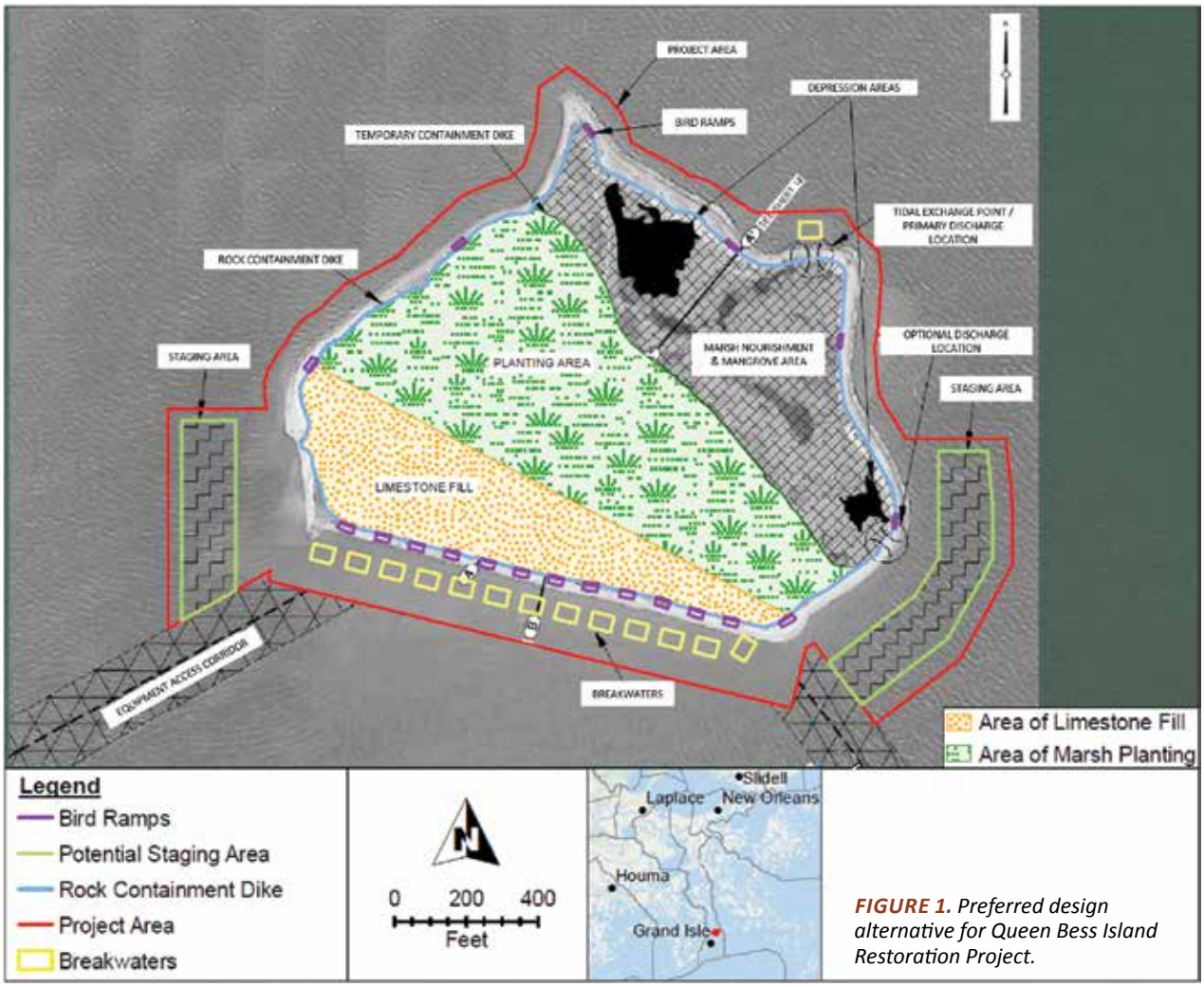

FIGURE 1. *Preferred design alternative for Queen Bess Island Restoration Project.*

Rabbit Island

Rabbit Island represents the only brown pelican colony in southwest Louisiana. The island has historically provided essential nesting habitat for a number of species impacted by the 2010 *Deepwater Horizon* oil spill (brown pelican, colonial waders, terns and black skimmers), including species of special concern (reddish egret, American oystercatcher) as identified within the LDWF Wildlife Action Plan. However, the island's mean high-water elevation (1.01' NAVD88) results in most of the island being inundated on high tides and is the leading source of colonial waterbird nest mortality (nest inundation). It is not uncommon to lose over 50 percent of nests in a given year due simply to tidal inundation. As such, restoration of Rabbit Island was prioritized by LDWF within Louisiana Trustee Implementation Group Restoration Plan #1: Restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; and Birds (October 2016).

Flooded colonial waterbird nest documented on Rabbit Island by LDWF Biologist Samantha Collins.

FIGURE 2. *Proposed design alternative for Rabbit Island Restoration Project.*

LDWF actively participated in all engineering and design activities toward the eventual development/selection of Proposed Design Alternative (Alternative 2); the design determined to cause the fewest environmental impacts while preserving the island's 200-acre footprint (*Figure 2*). The design would raise the island's elevation using dredged fill material (fill) from the Calcasieu Ship Channel. Fill would be placed in three completely contained fill area cells for construction of optimal colonial waterbird nesting and brooding habitat. Fill Area Cell A would be constructed to a +3 ft NAVD88 elevation, with a very gradual slope inward towards an existing tidal creek and pond. Fill Area Cell B of the island would be pumped to a +3.5 ft NAVD88 elevation with a natural slope to an existing pond. Fill Area Cell C would be constructed to a +3 ft NAVD88 elevation with a natural slope to an existing pond and tidal creek. An estimated 673,400 cubic yards are anticipated to be dredged and placed in these contained cells. The linear footage of the containment dike is approximately 12,870 feet.

Extensive conversation and coordination was implemented amongst designated Office of Fisheries personnel towards minimizing potential impacts to the state's Tier 1 public oyster seed ground in association with this restoration project. To that point, a host of best management practices were instituted for the project duration including:

1. Stringent island access guidelines for project contractors.
2. Installation and maintenance of Type II sediment curtains along the full extent of the project's access corridor.
3. LDWF project oversight to ensure full best management practices compliance and coordination with Office of Fisheries.

Proposed Timeline

Based on current (end of 2018) scheduling, the Rabbit Island Restoration Project will initiate construction in August or September 2020.

Living Coastal and Marine Resources

In September 2017, Louisiana Trustee Implementation Group issued a Notice of Solicitation of Project Ideas for the following restoration types: Birds, Marine Mammals, Sea Turtles, Oysters and Submerged Aquatic Vegetation. LDWF submitted the following restoration proposals:

New Harbor Island Restoration

Executive Summary: New Harbor Island remains one of the state's most important rookeries within the Chandeleur Islands. However, natural and manmade impacts, with emphasis placed on the 2010 *Deepwater Horizon* oil spill, has resulted in significant natural resource injury. Project proposes to increase existing island size by approximately 100 acres utilizing dredged sediment. Project will increase nesting habitat availability and quality for colonial waterbirds (e.g., brown pelicans, wading birds, terns, skimmers and gulls) among other species impacted by the 2010 *Deepwater Horizon* oil spill.

Targeted Enhancement of the Chandeleur Island Chain: An Ecosystem Approach

Executive Summary: The Chandeleur Islands, located within the Breton Island National Wildlife Refuge, comprise one of the state's most ecologically important coastal communities. These islands continue to provide a broad array of services, some at critical life stages, for a host of resident and migratory taxa, including threatened and endangered species. However, natural (e.g., hurricanes and tropical storms) and anthropogenic (e.g., habitat loss, climate change, oil spills) impacts, with emphasis placed on the 2010 *Deepwater Horizon* oil spill has resulted in significant natural resource injury throughout the Chandeleur Island chain. Therefore, Louisiana trustees propose implementation of multiple restorative approaches within a targeted section of the Chandeleur Island chain, a strategy that clearly addresses the trustees' overall goal of replenishing and protecting living and coastal resources impacted by the 2010 *Deepwater Horizon* oil spill.

Coast-wide Aerial Nest Surveys and Nest Dotting Analyses

Colonial waterbirds represent the most significantly impacted avian guild in association with the 2010 *Deepwater Horizon* oil spill. However, despite their inherent prevalence along the northern Gulf Coast, limited information exists as to this guild's baseline population estimates, annual variability in colony size and location, incidence of new colonies, productivity and location of foraging areas, amongst other factors. Collectively, this information is considered critical in documenting the effectiveness of ongoing and future bird restoration projects. As such, LDWF and the trustees supported the continuance of coast-wide aerial nest surveys and nest counting analyses utilizing established methods implemented during the 2010 *Deepwater Horizon* oil spill (2010-2013) as one of the principal

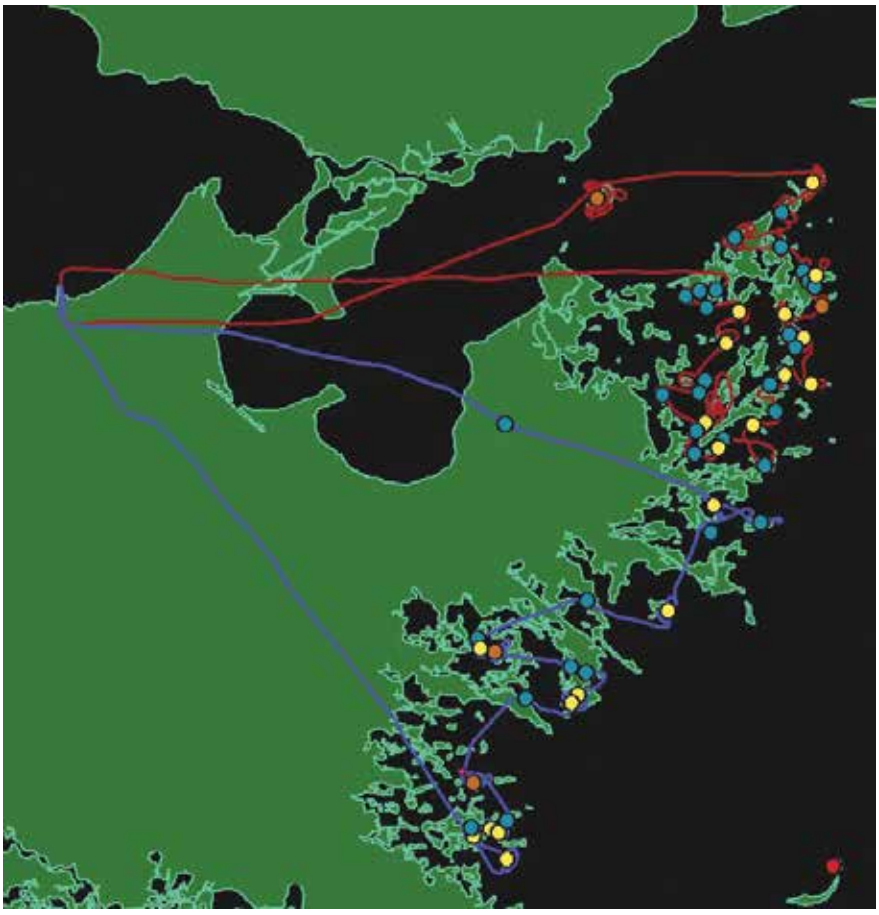

FIGURE 3. *Track lines within 2018 coast-wide colonial waterbird aerial nest survey*

means to bridge identified data gaps, document pre-construction avian productivity on Queen Bess and Rabbit islands (projects currently in E&D phase), and provide temporal knowledge as to the potential feasibility of potential future 2010 *Deepwater Horizon* oil spill avian projects (*Figure 3*).

Secretive Marshbird Population Modeling

Based on available habitat, Louisiana's coastal wetlands quite possibly supports the largest populations of secretive marshbirds in North America. However, the expansive and somewhat inaccessible nature of these habitats has generated significant data gaps (e.g., secretive marshbird species abundance and distribution within coastal basins), a fact that greatly limited the trustees' ability to document potential 2010 *Deepwater Horizon* oil spill injury to this guild. To address this problem, LDWF and the trustees proposed the collection of remotely sensed and local habitat data in tandem with call back surveys (i.e., the principal survey means for the guild) to create robust predictive models for estimating secretive marshbird densities within select coastal basins. Information generated will address identified data gaps and will characterize and promote beneficial habitat features that may likely benefit this bird guild.

Recreational-Use Restoration Projects

The 2010 *Deepwater Horizon* oil spill prevented Louisiana citizens from enjoying typical recreational activities, such as fishing and spending time on the beach. As such, trustees were charged with the restoration of lost recreational opportunities under the restoration approach: Enhance public access to natural resources for recreational use. This approach principally focuses on:

1. creating new or improved access to natural resources for recreational purposes by enhancing existing or constructing new infrastructure.
2. providing or improving water access in publicly owned areas through the construction and operation of boat ramps, piers, or other infrastructure could also improve public access.
3. larger-scale infrastructure improvements such as the construction or improvement of roads and bridges could also serve to improve access to natural resources.
4. enhancing public access would also include targeted acquisition of land parcels to serve as public access points.

LDWF personnel, in tandem with Louisiana Trustee Implementation Group representatives, participated in project screening, evaluation and selection. A list of projects on state properties that were selected includes the following:

- Bayou Segnette State Park improvements
- Cypremort Point State Park improvements
- Grand Isle State Park improvements
- Atchafalaya Delta WMA campground improvements
- Pointe-aux-Chenes WMA recreational use enhancements
- Rockefeller Wildlife Refuge piers and Rockefeller signage
- Middle Pearl boat launch
- Pointe-aux-Chenes WMA Island Road fishing piers
- Pass-a-Loutre WMA campground improvements
- Pass-a-Loutre WMA Crevasse Access Project

Peer-Reviewed Manuscripts

Program personnel authored or contributed to several peer-reviewed manuscripts including the following:

Selman W, Pearson SH, Wiebe JJ. Population Structure, Morphology, and Demographics of Diamondback Terrapins (*Malaclemys terrapin*) in Coastal Louisiana. To be submitted to Chelonian Conservation and Biology

Pearson SH and Wiebe JJ. Interactions between Diamondback Terrapins *(Malaclemys terrapin*) and the Crab Industry in Terrebonne Bay, Louisiana: Do Ghost Traps Impact Terrapin Populations within Coastal Louisiana? To be submitted to Marine Pollution

Pearson SH and Wiebe JJ. 2018. Distribution, Sex Ratios and Size Distribution of Diamondback Terrapins (*Malaclemys terrapin*) in the Deltaic Plain of Louisiana. Herpetologica 74 (2):135-140.

Reinke B, Pearson SH, Selman, W. 2018 Plastron Pigmentation Variation in a Coastal Turtle Species of Conservation Concern (*Malaclemys terrapin*). Herpetologica 74(2): 141-145.

Pearson SH and Wiebe JJ. 2018. Considering diamondback terrapin (*Malaclemys terrapin*) nesting habitat and reproductive productivity in the restoration of Gulf of Mexico coastal ecosystems. Ocean and Coastal Management 155, 8-14.

FURBEARER MANAGEMENT

MONITORING FUR HARVEST

The 2017-2018 furbearer harvest was monitored by compiling distribution and total harvest data. Each year, fur buyers and dealers are required to submit reports providing information on pelts purchased by species and parish of harvest. Annual audits of all fur dealers provide a record of total pelts by species shipped from Louisiana. Individual trappers are also required to submit records of pelts harvested that they shipped out of state. River otter and bobcat possession tags provide data on timing and location of all bobcat and otter harvested in the state. These tags are necessary to ensure that Louisiana otter and bobcat are tagged with federal export tags (a federal requirement for out-of-country shipment).

Records indicate a total of 2,374 trapping licenses were sold during the 2017-2018 trapping season. Of these, 2,238 were adult residential licenses, 36 were adult non-residential trapping licenses, and 100 were youth residential licenses. These figures show a 10 percent increase in trapping licenses sold when compared to the previous season (2,133).

A total of 5,542 animals were harvested for fur (all species), which was a decrease of 642 from the previous season's total of 6,189. The total value of the 2017-2018 fur harvest to the state's trappers was estimated at $50,394.16. This total value was a decrease from the previous season's total of $57,919.19.

The nutria harvest (170,471) decreased sharply by 45,581 from the previous season's total of 216,052. The average nutria pelt price paid to trappers during this past season was $2. An additional $5 was paid for all nutria taken during the Coast-wide Nutria Control Program by registered participants. A mail out survey was conducted post-season and the results indicated that in some areas, water levels in the marsh reduced access to areas that participants typically hunt.

COAST-WIDE NUTRIA CONTROL PROGRAM

The Coast-wide Nutria Control Program is funded by the Coastal Wetland Planning, Protection and Restoration Act. The objective is to decrease nutria-induced damage to coastal vegetation by increasing the incentive for harvest. During the 2017-2018 season, a total of 170,471 nutria tails, worth $852,355 in incentive payments, were collected from 263 participants. This showed an increase in participation from the previous year's 228. One-hundred-and-three participants (39 percent) turned in less than 200 tails, 75 participants (28 percent) turned in 200-499 tails, 23 participants (8 percent) turned in 500-799 tails, and 62 participants (23 percent) turned in 800 or more tails.

photo courtesy of Shutterstock.com

TABLE 6.

10-YEAR AVERAGE VALUE FOR EACH SPECIES				
Species	Total Harvest for the 2017-18 Fur Market	10-year Average Harvest	Average Price Paid Per Pelt (includes cost of green fur as well as dried fur)	10-year Average Value For each species (2008-2018)
River Otter	853	1,648	$24.42	$58,968.84
Raccoon	2,097	6,632	$2.80	$25,773.12
Bobcat	245	488	$29.59	$17,027.93
Nutria	235	6,767	$1.77	$12,383.79
Beaver	1,352	1,829	$6.62	$11,725.72
Mink	367	683	$7.29	$5,263.88
Gray Fox	125	346	$7.59	$3,995.03
Muskrat	32	673	$1.50	$1,911.81
Red Fox	23	64	$12.25	$872.54
Coyote	146	83	$10.74	$544.82
Opossum	66	166	$0.52	$109.63
Total	5,542	19,379	$50,394.16	$134,577.11

TOTAL NUMBER OF NUTRIA HARVESTED BY METHOD OF TAKE IN 2017-2018

Twenty-one parishes were represented in the 2017-2018 program season with harvests ranging from 154 to 40,581 nutria per parish. The greatest number of tails (40,581) were collected from Terrebonne Parish, followed by Plaquemines (29,474) and St. Mary parishes (26,869).


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January was the most active month for harvesting nutria (47,951 tails) while November was the least active month (8,444 tails). (See Coast-wide Nutria Control Program 2017-2018 Report, CWPPRA Project LA-03b, nutria.com/site13.php).

VEGETATIVE DAMAGE CAUSED BY NUTRIA

As a monitoring requirement of the Coast-wide Nutria Control Program, a coast-wide aerial survey was conducted in April 2018 covering the coastal parishes of Louisiana. Twenty-one sites were visited in 2018, 12 of which were identified as having nutria damage in 2017 (nine were identified as new damage). No sites that were revisited from the previous year were identified as recovered.

The 21 nutria-damaged sites observed along transects during the 2018 survey had a total of 4,380 acres impacted by nutria feeding activity (16,424 extrapolated). This is approximately a 180 percent increase in acres impacted by nutria since the 2017 survey (1,564 acres, extrapolated to 5,866 acres coast-wide). The Coast-wide Nutria Control Program continues to be a successful means of controlling the nutria population with an average of over 300,000 animals harvested annually. Despite the reduced level of harvest this past season, the program has been successful in achieving its goal and the number of nutria-impacted acres in Louisiana's coastal marsh has decreased significantly over the 15 seasons of the program.

FUR ADVISORY COUNCIL

The Fur Advisory Council has continued to focus on three major goals this year. The first goal is to educate the public concerning the role of wildlife utilization in conservation and habitat management which serves to address public opinion of the fur market. The second goal is to educate both new and experienced trappers on state regulations, best management practices and handling fur from the field through the finishing process. The third goal is to bolster Louisiana's fur industry through marketing and trade shows.

The Fur Advisory Council has continued to interface with the public through local events such as the Cameron Wildlife Festival, 4-H Achievement Days and National Hunting and Fishing Day events. The council website carried the educational story to a much broader audience (*www.louisianafur.com*).

The council contracted through May 2018 with Brent Poley of Canchilla Associates Limited. Poley worked with Louisiana fur dealers and international buyers and coordinated sales of nutria to Spain, raccoon to China, and a variety of Louisiana furs to Greece. The contractor participated in the Hong Kong International Fur and Fashion Fair, the International Luxury Outerwear Expo in Chicago, Illinois, and the MiFur Fair in Milan, Italy. He also attended the North American Fur Action in Ontario and met with the International Fur Federation on several occasions regarding the trend to certify fur origins via the FURMARK label.

LDWF has worked with the Association of Fish and Wildlife Agencies to construct an online trapper education course and see it advertised across LDWF platforms and on local trapper websites (*conservationlearning.org/login/index.php*). LDWF has also partnered with the Louisiana Trappers and Alligator Hunters Association to provide a series of hands-on trapping workshops to compliment the online course, which the Fur Advisory Council has supported with supplies and resources. Four trapping workshops were held in FY 2017-2018 around the state, and a three-day trapping school was held at the Woodworth Educational Center. Students learned about trap preparation, skinning and hide care, regulations and best management practices. The council has worked to make sure that the art of fur trapping continues as part of Louisiana's living heritage.

ALLIGATOR PROGRAM

Louisiana's Alligator Management Program consists of two complex segments: research/management of the wild population and a statewide farm/ranch program. The program is funded by alligator industry generated revenues (alligator hide tag fees, shipping label fees, alligator hunting license fees, alligator hide severance taxes, and other alligator related fees).

WILD ALLIGATOR PROGRAM

Inventory methods, harvest regulations, tagging and reporting requirements, and a complex computer program are continually upgraded to regulate and monitor a sustainable-use alligator management program in Louisiana. Annual coast-wide alligator nest surveys are conducted to index alligator populations and to establish harvest quotas in coastal Louisiana. During the summer of 2017 we estimated that 50,898 alligator nests were present in the coastal marsh habitats; a record year due to optimum marsh water level and habitat conditions.

Wild alligator harvest quotas are established to correlate harvest with alligator population density and distribution. Alligator harvest tags are allocated to individuals who either own or lease land that is considered alligator habitat. Digital landowner and survey information are combined with the latest aerial photography images to allow for an accurate assessment/classification of each participant's property. The majority of the lands enrolled in the wild alligator harvest program have been entered in the GIS system for property ownership and habitat assessment.

Each year the alligator program staff works closely with landowners and alligator hunters to provide assistance regarding alligator management on their respective properties. We have provided numerous habitat base maps to landowners for their use in participation of both the wild and alligator egg harvest programs. Harvest reports summarizing average lengths and size class frequency distribution of harvested alligators are available upon request.

Under this sustained use alligator program, over 1 million wild alligators have been harvested since 1972. The annual harvest takes

FIGURE 4. LOUISIANA COASTAL MARSH ALLIGATOR NEST PRODUCTION (1970-2017)

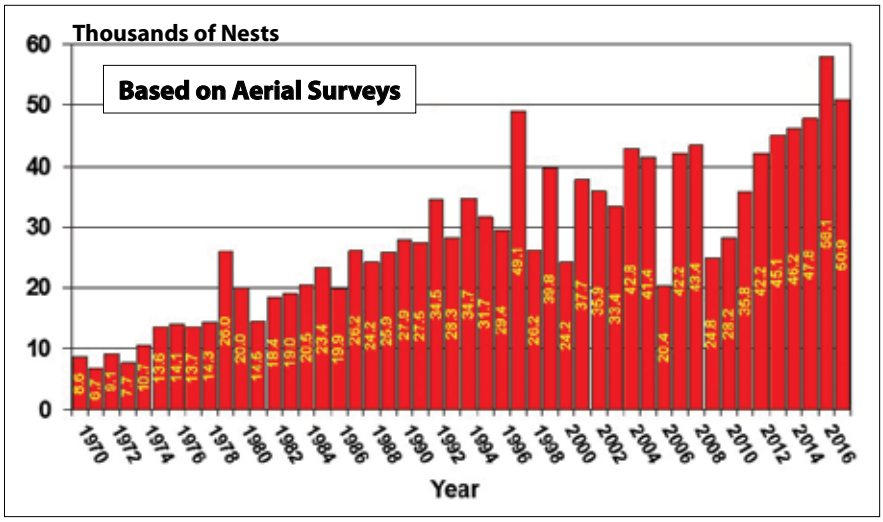

FIGURE 5. LOUISIANA WILD ALLIGATORS HARVESTED (2017 REGULAR HARVEST SKIN LENGTHS)

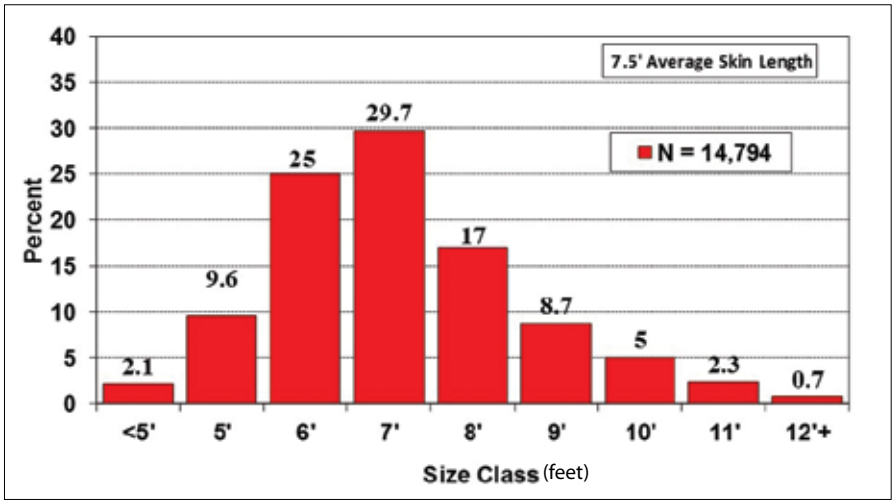

FIGURE 6. LOUISIANA FARM ALLIGATORS HARVESTED (2017 SKIN BELLY WIDTHS)

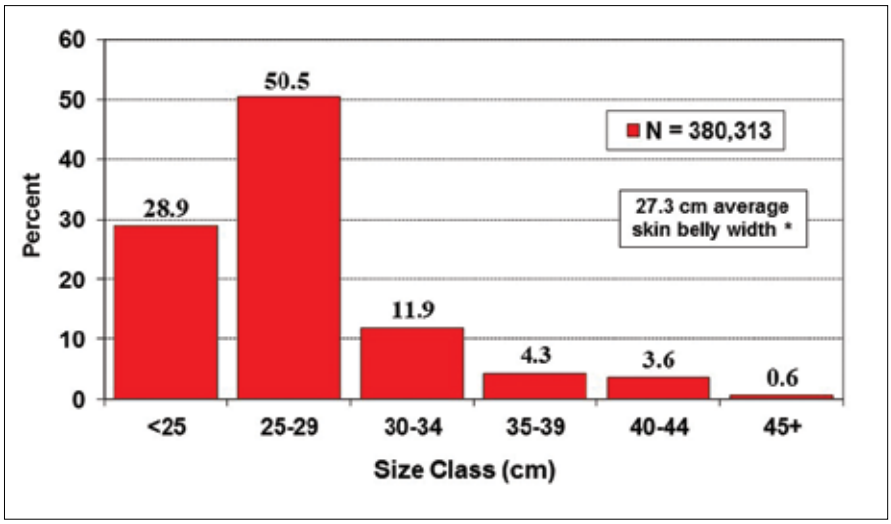

photo by Roberto Michel, Shutterstock.com

place in September to specifically target the adult males and immature segments of the alligator population. Adult females, which typically inhabit interior marshes in September, would be more susceptible to harvest if the season was scheduled during the spring or summer. During the 2017 wild season, a total of 15,052 alligators were harvested by 2,608 licensed alligator hunters. Alligators harvested averaged 7.55 feet in length, with an estimated value of $3.3 million. Adult-sized alligators (those 6 feet and larger) comprised the majority of the harvest. The decrease in harvest can be attributed to a global surplus of crocodilians skins.

LDWF provided additional alligator harvest opportunities for the general public by continuing its lottery alligator harvest program. In 2017 the lottery alligator harvest program provided opportunities for 363 alligator hunters to harvest 937 alligators. Lottery alligator harvests were conducted on 45 public areas (WMAs and public lakes) throughout the state.

FARM ALLIGATOR PROGRAM

The January 2018 statewide farm/ranch inventory totaled 857,728 alligators, down slightly from the record 923,072 alligators in January 2017, with high numbers due to several consecutive years of excellent nesting and high numbers of egg collections. The decline in 2012 was due in large part to the worldwide economic recession, and to farmers voluntarily limiting their egg collections significantly in the summer of 2009; then collecting about half the usual amount in 2010 (205,261 eggs) as markets and demand slowly improved. Market conditions were strong with high demand for farm hides, but lower demand for wild hides has been an issue for the last year. Nest counts were high in 2017, but Tropical Storm Cindy hit on June 21-22, 2017 and led to flooding of eggs across the coast, thus egg collections were lower (despite a high nest count) in 2017.

During the 2017 tag year (January through December 2017) an estimated 382,039 farm-raised alligators were harvested, averaging 27.3 cm belly width. The total estimated value of these alligators was $70 million.

Farmers participating in the wild alligator egg collection program are required to return a percentage of the eggs hatched as 4-foot alligators, which compensates the wild alligator population for the collection of eggs. This return rate percentage was decreased to 10 percent in early 2017, to start with the 2017 year egg permits. The remaining animals can be sold by the farmer. During 2017, a total of 49,112 farm-raised alligators were released to the wild. All released alligators were measured, marked, tagged and sexed. Survival of farm-released alligators appears to be similar to wild alligators. Re-trapped alligators were harvested in September 2017, and data on size class and sex ratio collected. Data evaluation continues on survival rates of the farm-released alligators.

Program staff members routinely communicate with various alligator industry participants including trappers, farmers, landowners and dealers. Information is provided regarding wild alligator and alligator egg harvests, harvest statistics and management recommendations (*Table 7*). Staff routinely visits alligator farms providing recommendations on alligator husbandry and culture. Numerous requests for information are handled each year.

TABLE 7.

WILD ALLIGATOR EGG COLLECTIONS BY ALLIGATOR FARMERS (2011-2017)

Year	Wild Alligator Eggs Collected	Hatchlings Yielded
2011	353,176	300,546
2012	413,648	349,514
2013	498,285	432,386
2014	528,719	468,142
2015	465,100	394,231
2016	616,546	548,416
2017	387,373	332,711

NUISANCE ALLIGATOR PROGRAM

LDWF manages a statewide nuisance alligator control program. The nuisance program is designed to remove problem alligators in order to avoid potential human/alligator conflicts. Through the process of nuisance alligator hunter appointments and annual renewals, LDWF maintains a statewide network of qualified nuisance alligator hunters. Nuisance alligator complaints are phoned into various LDWF offices, where complaints are recorded and then forwarded to a nuisance alligator hunter in the vicinity of the complaint. Nuisance hunters respond promptly and catch and remove the alligator as deemed necessary. Hunters are allowed to harvest the nuisance alligator and to process the meat and skin of the alligator for commercial sale. This process provides for immediate response to problem alligators and for payment to the nuisance alligator hunter, thereby minimizing the program operating costs to the department.

During FY 2017-2018, a total of 50 nuisance alligator hunters were enrolled in the program; annually the nuisance hunters respond to several thousand complaints and harvest approximately 800 alligators.

RESEARCH ACTIVITIES

The following list provides a summary of the various research and monitoring projects that the alligator program staff conducted and/or participated in during FY 2017-2018.

MONITORING

1. Evaluation of Survival, Growth and Reproduction in Farm-Released Alligators -

This activity involves numerous projects related to survival analysis, growth, and reproductive success (farm-released vs. native wild). Due to the reduction of the release rate percentage, it is imperative to monitor survival closely. The 12 percent return rate started with the 2007 permits (releases "due" in 2009); and this was decreased to 10 percent starting with the 2017 year permits. Information on size class frequency distribution of wild alligator populations and susceptibility to harvest is provided annually to enhance survival estimates. Although some growth information has been published we plan to evaluate growth rates in more detail; we now have "re-traps" that were captured over 20 years since release, and this is undoubtedly one of the largest mark-recapture projects currently in progress. Previously staff from the LSU Department of Experimental Statistics assisted with annual evaluation of survival and growth based on farm "re-traps" recovered in September harvests. We worked with contractors from LSU's School of Renewable Natural Resources providing input as to analyses on this project, which included a graduate student Master's degree project. We have begun preliminary plans on writing a manuscript with the graduate student and her major professor on the results.

2. Coast-Wide Nest Survey -

The annual coastal nesting survey is essential for monitoring our alligator population, and is used annually to determine wild alligator and wild alligator egg harvest quotas (for the adult harvest each September as well as egg ranching quotas). This is an integral part of our required "finding of no detriment" needed to achieve for export authorization by the USFWS.

3. Evaluation of Statewide Harvest Program -

We continue to analyze size class frequency distribution, average size, sex ratios, etc. for alligators harvested each year. During the 2017 wild season, staff collected sex ratio data on 8,895 alligators (66.9 percent males, 33.1 percent females) which represented a significant percentage of the total alligators harvested. This project, coupled with coast-wide nest survey provides critical information regarding the status of the wild alligator population. Data generated from these projects provides the basis for evaluating the impact of our current harvest strategies and for establishment of annual wild harvest quotas.


photo by Sailplans, Shutterstock.com

4. Evaluation of Alligator Nest Density -

LDWF biologists work with cooperating alligator farmers to gain access to their GPS data from annual egg collections. This data will facilitate comparisons between our coast-wide nest survey and estimates of nest density as recorded by the farmer during egg collections. Some farmers have advised staff of reduced nest production on selected wetlands; close review of this nesting production data will allow us to evaluate nest distribution and density changes over time. However, many areas had excellent nest production; the estimated nest count of 50,989 was the second highest on record, but egg collections were adversely affected in 2017 by Tropical Storm Cindy which hit June 21-22, 2017 and caused nest flooding.

5. West Nile Virus -

LDWF, in conjunction with LSU School of Veterinary Medicine (LSUSVM), continues to monitor occurrence of West Nile Virus on alligator farms in Louisiana. Initial mortality related to West Nile Virus occurred in the fall/winter of 2003. Aggressive mosquito control on farms has reduced on farm mosquito populations and seems to have reduced the incidence of West Nile Virus in recent years. During FY 2017-2018, we continued to have expertise from staff at LSUSVM available if needed to collect samples from farm alligators to monitor for any health concerns, provide diagnostics as needed, and assist with other health surveillance parameters. After several years of research, development and testing, a West Nile Virus vaccine was developed, gained conditional approval by the USDA and became available to farmers in October 2011. Several farmers have taken advantage of this new proactive technology to prevent West Nile Virus in captive hatchling and yearling alligators.

6. Best Management Practices -

LDWF and LSUSVM, in conjunction with the Louisiana Alligator Farmers and Ranchers Association, developed a document entitled "Best Management Practices for Louisiana Alligator Farming." The document was distributed in June 2011 and details recommended practices to ensure animal welfare of captive reared alligators in Louisiana, including egg collection, hatching, rearing, release to the wild and euthanasia. This document was updated and distributed in January 2013 and again in January 2016 as new information regarding euthanasia was investigated, and will be updated as any pertinent topic to alligator faming becomes available. The intent of this document is to ensure that licensed alligator

farms/ranches are employing humane methods of working with alligators. Through industry contributions, Dr. Nevarez at LSUSVM has continued to work with LDWF staff to update Best Management Practices as needed. LDWF staff assisted with review of a detailed document on Best Management Practices for all farmed crocodilians last fiscal year; both documents have proved to be valuable resources for industry personnel.

7. Alligator Research Facility -
After several years of planning and fund raising by industry personnel, construction began on an alligator research facility at LSU's AgCenter Aquaculture Research Station. Funding for facility construction was provided purely by monetary donations from alligator industry participants including alligator farmers, wetland landowners, tanners, feed manufacturers, alligator hunters and other interested parties. The building is available to house alligators of various sizes for projects related to all phases of alligator husbandry. LDWF staff has worked closely with alligator producers and feed manufacturers to provide input to identify and prioritize research goals and secure long term funding sources for facility operation. The LSU AgCenter has established an Alligator Research Fund to receive additional donations for funding various research projects. Hatchlings were provided to Dr. Reigh by LDWF from eggs collected and incubated at Rockefeller Refuge for continued incubation and nutrition studies to benefit the alligator farming industry; various diets and feeding regimes are tested and findings disseminated to industry personnel at meetings throughout the year. Eggs were also provided for detailed studies on the effects of supplemental oxygen and varying humidity levels provided during egg incubation.

CONTRACTS

1. Diagnostic Services (LSUSVM - Dr. Javier Nevarez) -
Dr. Nevarez is contracted to provide diagnostic services as needed for the alligator industry. Farmers may consult with Dr. Nevarez at any time for assistance with any alligator husbandry or disease issue. Our staff often assists with logistics and transport of alligators/samples to LSUSVM in Baton Rouge for evaluation. Periodic health surveillance of farm released alligators is conducted to monitor health status of farm alligators released to the wild; a manuscript on these findings is being prepared. Dr. Nevarez and colleagues worked with LDWF to evaluate possible culture of Chlamydia from alligator embryos/eggs in FY 2017-2018.


photo by Heiko Kiera, Shutterstock.com

2. Health Monitoring (LSUSVM - Dr. Javier Nevarez) -
Dr. Nevarez has been instrumental in providing guidance in evaluating concerns over possible disease introduction from alligators (predominantly hatchlings) imported from other southeastern states. Concerns are focused on Mycoplasma and Chlamydia. Preliminary samples were collected from wild alligators (liver and lung tissue) while a contract was being drafted. We began discussions to try to collect samples from imported hatchlings and additional wild alligators to survey for prevalence of these microorganisms, if present.

3. Nutrition Research (LSU AgCenter, Aquaculture Research Station) -
A research contract was established for aquaculture nutritionist Dr. Robert Reigh and his research associate to conduct digestibility studies continue to aid farmers in their farm management; industry support from feed manufactures at Cargill have been instrumental in this process. Research committee meetings are held periodically and projects are outlined for study. Current work is underway evaluating varying levels of oxygen and humidity during incubation for optimum hatchling performance; and specific amino acid requirements during grow-out. A Master's degree student was recruited and is currently doing thesis research on these projects. Of interest, Dr. Robert Reigh and Ms. Millie Williams have shown alligators are capable of digesting plant proteins. Their paper "Plant Products in Compounded Diets Are Effectively Utilized by American Alligator, *Alligator mississippiensis*" was published in the Journal of the World Aquaculture Society.

OTHER RESEARCH

In addition to LDWF research studies, we continued to support and collaborate with graduate students, post-doctoral research associates, and university faculty with their research studies on numerous projects. Associates from several universities (Harvard University, Yale University, University of North Texas, University of Southern California, University of North Florida and California State University - San Marcos) were hosted at Rockefeller in 2017-2018 to collect additional samples for several studies, or we provided samples to them if travel costs were prohibitive. Several collaborators made presentations with LDWF staff as co-authors at meetings as listed on page 74.

We published several abstracts and full papers this year, one of which was selected for a Publication Award by the Louisiana Association of Professional Biologists. Staff members organized and participated in an alligator session at the Southeast Association of Fish & Wildlife Agencies conference in Louisville, Kentucky in October 2017; and plans were made to develop a formal Alligator Working Group; focus items include finding solutions for low wild hide prices and concerns about disease transmission with alligators moved between states.

Our research efforts have been hampered in large part by lack of holding facilities for alligators. We had a small functioning laboratory, but the tremendous physical plant losses due to Hurricane Rita in 2005 and Hurricane Ike in 2008 have limited our progress. This lab was a shared room in the maintenance workshop and is now not usable due to repairs to the shop. Construction of the new laboratory building and improved alligator holding facilities will aid our research progress in the future.

Research Manuscripts Published in 2017

Arias, A. A., J. B. Doyle, K. Vega, V. Mejia, P. Bryan, M. Aldana, E. Gonzalez, M. Noriega, N. A. Membrano, A. Castro, R. M. Elsey, and T. Owerkowicz. 2017. (Abstract). Effects of exogenous acetazolamide on growth and calcium flux in alligator embryos. Presentation at the Society for Integrative and Comparative Biology annual meeting. New Orleans, Louisiana January 4-8, 2017.

Carter, J., R. M. Elsey, and S. Merino. 2017. (Abstract). Does consumption of invasive female apple snails (*Pomacea maculata*) have adverse effects on American alligators (*Alligator mississippiensis*)? Poster presentation at the Louisiana Association of Professional Biologists meeting. Lake Charles, Louisiana. August 10-11, 2017.

Conner, J. L., J. L. Crossley, R. M. Elsey, D. Nelson, T. Wang, and D. A. Crossley II. 2017. (Abstract). Does the left aorta in crocodilians provide proton-rich blood to the gut during digestion? Presentation at the annual meeting of the Society for Experimental Biology. Gothenburg, Sweden 4-7 July 2017.

Crossley, D. A. II, R. Ling, D. Nelson, T. Gillium, J. L. Conner, J. Hapgood, R. M. Elsey, and J. Eme. 2017. Metabolic responses to chronic hypoxic incubation in embryonic American alligator (*Alligator mississippiensis*). Comp. Biochem. Physiol. A 203:77-82.

Doyle, J. B, A. A Arias, M. Aldana, P. Bryan, A. Castro, E. Gonzalez, V. Mejia, M. Noriega, K. Vega, N. A. Membrano, R. M. Elsey, and T. Owerkowicz. 2017. (Abstract). Cracks in eggshells impair embryonic growth in the American alligator. Presentation at the Society for Integrative and Comparative Biology annual meeting. New Orleans, Louisiana. January 4-8, 2017.

Elsey, R. M., R. Hebert, J. Nevarez, and N. W. Utsuki. 2017. American alligator (*Alligator mississippiensis*) with forelimb fibroma. Crocodile Specialist Group Newsletter. 36(1):6.

Elsey, R. M., D. LeJeune, B. Landry, K. Reed, M. Miller, and M. D. Kaller. 2017. Prevalence and details of polydactylism in the American alligator, *Alligator mississippiensis* in Louisiana. Herpetological Conservation and Biology. 12:(2)342-349.

Elsey, R. M., E. Ledet, and J. Carter. 2017. *Alligator mississippiensis* (American alligator). Novel nonnative prey. Herpetological Review. 48(3):627-628. [apple snails in alligator stomach]

Elsey, R. M. 2017. Louisiana's alligator research and management programs. Louisiana Wildlife Insider. Fall/Winter 2017. 2-6.

Elsey, R. M., D. LeJeune, M. Miller, and A. R. Guidry. 2017. *Scincella lateralis* (Ground Skink). Seasonal timing of nesting. Herpetological Review 48(3):661-662.

Elsey, R. M., D. LeJeune, W. Strong, and W. Selman. 2017. *Trachemys scripta elegans* (Red-Eared Slider). Abnormal shell morphology with kyphoscoliosis. Herpetological Review. 48(4):837-838.

Gabrey, S. W. and R. M. Elsey. 2017. Birds in the diet of American alligators. Journal of Louisiana Ornithology. 10:1-10.

Kahn, S., S. Sapozhnikov, R. M. Elsey, A. O'Conner, and A. Vasilyev. 2017. Histological characterization of nephrogenesis in the American alligator. Poster presentation. New York Institute of Technology, College of Osteopathic Medicine. Summer Research Symposium.

Platt, S. G. and R. M. Elsey. 2017. *Alligator mississippiensis* (American alligator). Feeding aggregation and behavior. Herpetological Review 48(3):628-629.

Rehorek, S. J., R. M. Elsey, S. C. Beeching, and T. D. Smith. 2017. Development of the snout in American alligators (Abstract). Poster presentation at the Regional Meeting of the American Association of Anatomists. Pittsburgh, Pennsylvania. November 4, 2017.

Shirley, M. G. and R. M. Elsey. 2017. Alligator Production: Breeding, Egg Collection, Incubation, and Hatching. SRAC Publication No. 231. Revised November 2017. 6 pgs.

Skates, D. I., N. Ball, R. M. Elsey, A. K. Lappin, and T. Owerkowicz. 2017. (Abstract). Cranial shape and bite force are not affected by death-roll feeding behavior in the American alligator. Presentation at the Society for Integrative and Comparative Biology annual meeting. New Orleans, Louisiana. January 4-8, 2017.

Wu, P., J. Yan, Y. Lai, C. Ng, A. Li, X. Jiang, R. M. Elsey, R. Widelitz, R. Bajpai, W. Li, and C. Chuong. 2017. Multiple regulatory modules are required for scale-to-feather conversion. Molecular Biology and Evolution. 35(2):417-430. msx295, *https://doi.org/10.1093/molbev/msx295*

We also have several manuscripts currently in press or in review; and we serve as manuscript reviewers for multiple scientific journals and review numerous manuscripts each year.

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ALLIGATOR ADVISORY COUNCIL

The Alligator Advisory Council is responsible for reviewing and approving recommended marketing, research and educational programs funded through the alligator resource fund. The Alligator Advisory Council monitors and addresses numerous issues affecting the alligator industry at local, national and international levels. The council supports husbandry and disease research through LSU AgCenter, addresses public concerns regarding animal welfare through media and education, engages in international conservation and trade issues, carefully monitors local and national legislation that may impact wildlife management, and communicates with designers and manufacturers to promote the use of sustainable Louisiana products.

LDWF contracted with Advocacy and Consulting upon recommendation of the Alligator Advisory Council to facilitate the successful passage of legislation that would eliminate the sunset clause to Penal Code 653o. The sale of alligator and crocodile products within the state of California is permitted as an exemption to the anti-wildlife trade laws under this bill until the sunset clause activates on Jan. 1, 2020. California has historically been a strong pro-animal rights state. The council continues to discuss the importance of exempting alligators from the anti-wildlife trade laws, and the goal of this contract is to eliminate the sunset clause and to maintain a permanent exemption status in California for crocodilians legally traded under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulations.

LDWF administrative and biological staff participate in several international conservation groups including CITES, Crocodile Specialist Group, and the International Union for Conservation of Nature. The council's participation in CITES, Crocodile Specialist Group and International Union for Conservation of Nature monitoring continues to provide a strong foundation for sustainable international trade. LDWF contracted with Christy Plott of Monarch Marketing to assist with technical representation at national and international meetings involving wildlife trade issues. LDWF staff and Ms. Plott established alliances within CITES, Crocodile Specialist Group and International Union for Conservation of Nature. She was accepted as an observer to the 2018 CITES Animal Committee meeting in Switzerland. Along with LDWF staff, she coordinated with industry members to investigate possible solutions to a variety of issues affecting the alligator Industry, including wild alligator market challenges and international shipping delays.

Ms. Plott through Monarch Marketing is also responsible for developing domestic marketing. She created a social media presence to promote Louisiana alligators, pitched sustainable use articles, and has worked with tanneries, designers, manufacturers and retailers to encourage positive messaging.

LDWF contracted with the World Conservation and Monitoring Center to develop the International Alligator and Crocodile Trade Studies report. This report has been funded since 1988 to monitor world trade in all crocodilians and to increase accountability of sustainable management practices.

LDWF contracted with Glenn Delaney to monitor legislation in Washington D.C. that may impact Louisiana's alligator management program. Glenn Delaney works closely with the Louisiana delegation to educate them on issues important to LDWF and the Alligator Advisory Council.

The Alligator Advisory Council worked with the LSU School of Human Ecology to promote the use of lower grade alligator skins. LSU staff hosted two alligator leather working seminars in Beijing, China. Staff also attended outreach events through LSU and the Beijing Institute of Fashion and Technology and maintained an American Alligator Design Studio at both institutions. Student designs made with alligator skins were exhibited at the LSU Union Gallery.

COASTAL OPERATIONS PROGRAM

The Coastal Operations Program is responsible for the stewardship of 11 coastal WMAs and refuges totaling approximately 457,032 acres: Atchafalaya Delta WMA, Biloxi WMA, Isle Dernieres Barrier Islands Refuge, Lake Boeuf WMA, Marsh Island Refuge, Pass-a-Loutre WMA, Pointe-aux-Chenes WMA, Salvador WMA, State Wildlife Refuge, St. Tammany Refuge and Timken WMA. Management of these coastal properties encompasses the oversight of all daily activities on these areas. Responsibilities include (but are not limited to) marsh management and restoration, facility and equipment maintenance, data collection, assistance with research, habitat enhancement, coordinating managed hunts, oversight/monitoring of projects such as oil/gas activities and maintenance dredging of federal navigation channels, posting of properties, management of fur and alligator resources on properties, and education/outreach.

The Coastal Operations Program oversees and operates heavy equipment (excavators, bull dozers, a tugboat, a push boat, barges and other equipment) to aid with restoration and management on coastal properties. Coastal Operations staff replaced a 1996 excavator with the purchase of a new John Deere 250G long reach excavator in March 2018. Staff continued to properly maintain its heavy equipment since this equipment is crucial for the Coastal Operations Program to accomplish restoration and management activities on its properties.

Since most Coastal Operations Program properties are only accessible by boat, staff frequently provide assistance to stranded boaters and users of its WMAs/refuges. Coastal Operations staff provided emergency assistance to many boaters this year on our remote areas.

Overall, the Coastal Operations Program had a very successful year of numerous accomplishments. These accomplishments were aimed at improving refuges and WMAs for the good of the public and the natural resources that are present at these coastal areas. The Coastal Operations Program strives to provide excellent recreational opportunity, conserve coastal marsh habitats, and implement restoration projects to improve habitat conditions for wildlife and fishery resources.

WATERFOWL

The 2017-2018 waterfowl season was from Nov. 11, 2017 - Jan. 21, 2018 (closed Dec. 4-15) on coastal WMAs. Coastal Operations staff conducted hunter participation/harvest surveys on 11 days during the season on four coastal WMAs (Atchafalaya Delta, Pointe-aux-Chenes and Salvador WMAs, Pass-a-Loutre WMA was surveyed 10 days). An estimated 4,202 duck hunters visited the WMAs during the survey dates and averaged 2.6 ducks per attempt. Hunters also harvested approximately 2,305 coots, 412 gallinules, 45 mergansers and approximately 34 geese during the survey dates.

TEAL SEASON

The 2017-2018 teal season was from Sept. 15-30, 2017. Coastal Operations staff conducted hunter participation/harvest surveys on five days during the season on four coastal WMAs (Atchafalaya Delta, Pass-a-Loutre, Pointe-aux-Chenes and Salvador WMAs). An estimated 1,225 teal hunters visited the WMAs this year during the five days that waterfowl bag checks were performed. These hunters harvested an estimated 1,459 teal for a success of 1.2 teal per hunter effort.

DEER

Self-clearing permits and hunter check-in of harvested deer revealed that 2,651 hunter efforts were expended to harvest 114 deer during the 2017-2018 hunting season on Atchafalaya Delta, Pass-a-Loutre, Pointe-aux-Chenes, Lake Boeuf and Salvador WMAs. This equates to a success of one deer for every 23.3 efforts. Eighty-eight percent of the effort and harvest was on Atchafalaya Delta WMA.

HOGS

According to self-clearing permits and hunter interviews, approximately 184 hunter efforts were successful in removing 17 hogs for a success of one hog per 10.8 efforts. These statistics are for Pass-a-Loutre, Pointe-aux-Chenes, Salvador/Timken and Lake Boeuf WMAs only. Seventy-five percent of the effort and 76 percent of the harvest was on Pass-a-Loutre WMA. Twelve hogs were reported harvested from Atchafalaya Delta WMA during the 2017-2018 hunting season. Hog harvest at Atchafalaya Delta most always occurs while pursuing other species such as deer and rabbits.

COASTAL OPERATIONS' WMAS AND REFUGES

ATCHAFALAYA DELTA WMA

Atchafalaya Delta WMA is the largest WMA in the state at 137,000 acres and is located in southern St. Mary Parish. The WMA is owned by the state and has been managed by LDWF since 1978 under a lease agreement with the Louisiana State Lands Office. The habitat is dominated by fresh tidal marshes and extensive shallow water flats. This WMA includes a diverse range of ecotypes from broad upland ridge habitat to brackish marshes.

Atchafalaya Delta WMA is comprised of two active deltas that continue to accrete new wetlands. The Wax Lake Outlet Delta is located on the western portion of the WMA and was created as a result of a man-made channel dredged in the 1940s for flood protection purposes. This flood protection measure resulted in the creation of a phenomenal delta system that is of interest to a wide variety of users. One user group that is very intrigued by the Wax Delta is the community of professionals that study, construct and promote river diversions. The Main Delta is located on the eastern portion of the WMA and at the mouth of the Atchafalaya River. Many areas on this delta have been created/enhanced by beneficial using of dredge material.

WMA staff continued to work closely with the USACE on multiple issues related to the maintenance of the lower Atchafalaya River Federal Navigation Channel. USACE dredge contractors intermittently dredged portions of the Bar and Bay Channels through April 2018. See information below for specifics on projects and activities:

- Approximately 2.6 million cubic yards of dredge material was beneficially used to increase the size and elevation of Aves Island. Dredging for this project was completed in August.
- A dredging project that added 734 thousand cubic yards of dredge material to T-Pat Island was finished in February.
- Dredging operations were completed in April with approximately 676 thousand cubic yards and 234 thousand cubic yards of beneficial material placed on the northeastern side of Big Island and in the Camp Island Impoundment, respectively.
- Additional dredging/beneficial use projects are expected next fiscal year.
- Coastal Operations staff continued to provide multiple options for beneficial use of dredge material ranging from small areas adjacent to Big Island and the headquarters to large areas of open water that could accommodate millions of cubic yards of material.

The Atchafalaya Delta WMA houseboat mooring lottery and lease program continued during the 2017-2018 hunting season. Four houseboat leases were not renewed this year. Lease fees collected for houseboat mooring on the WMA totaled $13,165 in FY 2017-2018. The remaining mooring areas were issued by computerized lottery drawing. Fees collected for lottery permits generated $22,900. A total of 58 houseboat permits (lease and lottery) were issued for the 2017-2018 hunting season. The fees collect-

USACE pumping sediment from the Atchafalaya River Bay Channel to Aves Island for beneficial use on Atchafalaya Delta WMA.

***LEFT:** USACE pumping sediment from the Atchafalaya River Bay Channel to the Impoundment at Atchafalaya Delta WMA for beneficial use. **RIGHT:** Atchafalaya Delta WMA staff putting the final touches on posting the Limited Access Area prior to waterfowl season.*

ed were deposited into a houseboat mooring account that will be made available for future maintenance of mooring sites.

Coastal Operations staff assisted LDWF Minerals Management staff with coordinating oil and gas activities at Atchafalaya Delta WMA. Some oil/gas related activities for Coastal Operations staff included reviewing and commenting on proposals for proposed well locations, proposed pipelines and plug/abandonment projects. Staff also prepared special use permits for oil/gas activities as needed on the WMA.

Staff continues to support a wide variety of research and monitoring projects by granting access permits, providing lodging and assisting with logistics and information. Example projects are:

- LSU, University of Texas and University of Minnesota's National Science Foundation "Delta Observatory" Project designed to improve modeling and forecasting of delta growing processes that can support restoration and resource management.
- Coastal Estuary Services' efforts to monitor Coast-wide Reference Monitoring System sites.

Staff continued to maintain facilities, campgrounds and Big Island to a high standard this year. Atchafalaya Delta WMA staff and heavy equipment operators completed the following related projects.

- Dredged Berwick slip and dock area to allow boat access to docks, fuel, storage building, vehicles, etc.
- Graded/repaired Camp Island Impoundment road
- Replaced damaged water lines and water pump for Atchafalaya Delta WMA headquarters
- Aggregate was purchased and spread at Berwick dock parking area
- Repaired/re-lifted the road between Atchafalaya Delta WMA headquarters and the Main Delta campground (end of camp canal)
- Repaired boatshed docks at Atchafalaya Delta WMA headquarters

Coastal Operations staff was notified by Ducks Unlimited that Energy Transfer Partners provided funding for restoration projects on Atchafalaya Delta WMA. Staff assessed potential project sites and plan to conduct field evaluations early next fiscal year. Construction on this project should begin in late FY 2018-2019 or early FY 2019-2020.

2010 *Deepwater Horizon* oil spill settlement funds will pay for engineering, design and construction of multiple recreational use and enhancement projects on Coastal Operations WMAs. See the following list of such projects on Atchafalaya Delta WMA:

- Dredge waterways on Breaux's Pass and Cul-de-Sac to improve vessel access
- Wax Delta campground improvements (repair and bulkhead campground, replace two boat docks, construct rock jetties to protect campground)

Recreational use of the WMA totaled approximately 23,300 visitors.

Hunting Statistics

Deer Season

Archery Season	
Efforts	2,324
Harvest	88 deer (56 bucks, 32 does)
Success	1 deer/26.4 efforts
Youth Hunts	
Youth Participants	27
Efforts	47
Harvest	12 deer (4 bucks, 8 does)
Success	1 deer/3.9 efforts
Total Season	
Efforts	2,371
Harvest	100 (60 bucks, 40 does)
Success	1 deer/23.7 efforts

Teal Season

During the five bag checks conducted this year an estimated 475 hunters harvested 601 teal for an average success of 1.3 teal per hunter.

Waterfowl Season

During the 11 waterfowl bag checks conducted, an estimated 1,769 hunters averaged 2.3 ducks per hunter. Average hunter

Another successful youth hunt at Atchafalaya Delta WMA.

success was very similar across the WMA with approximately 0.1 duck per hunter differences between limited access areas and non-limited access areas. The top three species harvested on the WMA were blue-winged teal, green-winged teal and lesser scaup. Also harvested were 561 coots, 27 mergansers, 15 snow geese and two white-fronted geese.

Hog Season

Twelve hogs were reported harvested from Atchafalaya Delta WMA during the 2017-2018 hunting season. Hog harvest at Atchafalaya Delta most always occurs while pursuing other species such as deer and rabbits. Hunters reported an interest in harvesting hogs during roughly 866 hunts on Atchafalaya Delta WMA.

Rabbit Season

During the two rabbit bag checks (first two Saturdays of season) conducted, hunters averaged 0.8 rabbit per effort. WMA staff surveyed 16 hunters at the Main Delta and six hunters at the Wax Delta.

Alligator Season

A total of 237 alligator tags were issued to Atchafalaya Delta WMA commercial (210 tags) and lottery (27 tags) alligator hunters for the 2017 season. A total of 234 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

BILOXI WMA

Biloxi WMA is owned by the Biloxi Marsh Land Co. and has been managed by LDWF since 1957. This 42,747-acre WMA located in St. Bernard Parish is dominated by brackish smooth cordgrass and black needle rush. Along its southern boundary is Bayou Loutre which was the historic path of the Mississippi River. This WMA has very diverse habitat from low saline marshes in the northeast to freshwater ridges in the south.

LDWF staff performed annual boundary posting on Biloxi WMA in October 2017 and June 2018. LDWF continues to work closely with the landowner to provide public access as well as address any issues or conflicts.

Hunting Statistics

Waterfowl Season

One bag check was conducted during teal season on Biloxi WMA. There was an estimated 50 hunters that harvested 16 teal for an average of 0.32 teal/hunter. Due to reduced staffing we were not able to conduct bag checks on Biloxi WMA for the remainder of the waterfowl season.

ISLES DERNIERES REFUGE

This refuge is a series of barrier islands in Terrebonne Parish including Raccoon Island, Whiskey Island, Trinity Island, East Island and Wine Island. This refuge has been managed by LDWF since 1992, and ownership of the islands (except Wine Island) were transferred to the department in 2000. The refuge is saline marsh/dune habitat and home to the largest colonial water bird colony in Louisiana (Raccoon Island).

LDWF, USDA-NRCS and CPRA finalized plans and specifications for elevating the rock breakwaters and the removal of geotextile fabric on the containment levee associated with the Raccoon Island Shoreline Protection and Marsh Creation Project (CWPPRA - TE48) on Isle Dernieres Barrier Islands Refuge. Leblanc Marine was awarded contracts for both jobs, arrived on site in December and completed all work in May 2018. The elevated rock breakwaters will protect crucial nesting habitat for many birds including some species of concern.

LDWF staff conducting prescribed burning at Trinity Island to promote more desirable plant species growth and maintain vegetative health on Isle Dernieres Barrier Islands Refuge.

***ABOVE:** Contractors placing additional rock on the breakwaters at Raccoon Island as part of the TE-48 CWPPRA project on Isle Dernieres Barrier Islands Refuge. **BELOW:** Contractors removing geotextile fabric from the marsh creation containment berm for the TE-48 CWPPRA project on Isle Dernieres Barrier Islands Refuge.*

Coastal Operations staff worked closely with CPRA and the Louisiana Land and Exploration Company LLC. on the Terrebonne Basin Barrier Island and Beach Nourishment Project (TE-0143). Preliminary plans include dredging offshore and depositing dredge material on California Canal and the western deteriorated portion of Trinity Island. Coastal Operations staff will continue to work diligently with CPRA until this project is complete.

Various restoration projects were implemented or monitored this year including:

- Great Lakes Dredge and Dock Company was the contractor for the NRDA TE-100 Caillou Lake Headlands Beach and Dune Restoration Project (Whiskey Island). Offshore dredging began in the winter of 2016/2017 and was completed in April 2018. Over 10.5 million cubic yards of dredge material was deposited on Whiskey Island, creating over 800 acres of wetlands, dunes and beach habitats.
- USDA-NRCS contracted with Soil Erosion Services, LLC. for Phase III of vegetative plantings associated with the Raccoon Island Shoreline Protection and Marsh Creation Project (CWPPRA - TE48). Soil Erosion Services, LLC. completed the planting of 3,500 plants (1,750 matrimony vines/*Lycium caroliniamum* and 1,750 black mangroves/*Avicennia germinans*) in November 2017. This was the final phase of vegetative plantings for this project. LDWF assisted USDA-NRCS on all phases of this project (specifications, pre-construction meeting, field trips, staking out areas to be planted within the marsh creation area, final inspection, etc.).
- Coastal Operations staff assisted with Nicholls State University's annual Calypseaux trip. Approximately 500 black mangrove seedlings were planted on the marsh creation area of TE-48 on Raccoon Island for this project. Black mangrove propagules were collected from Whiskey Island to aid in future planting projects.
- CPRA conducted topographic surveys on Trinity Island associated with the upcoming TE-0143 project.

The refuge was host to multiple research and educational projects including:

- Nicholls State University staff and students conducted educational trips to the refuge this year. Nicholls State University staff conducted research and barrier island monitoring via unmanned aerial vehicles.
- University of Louisiana - Lafayette conducted research on brown pelicans, mammalian predators, as well as using unmanned aerial vehicles to assist in counting nesting colonial water birds.
- USGS accessed the refuge to conduct piping plover surveys, winter plover surveys and prey base monitoring as part of an extension from research starting in 2012.

USFWS and Coastal Operations staff pursued funding for restoration work at the refuge via the CWPPRA program. During FY 2017-2018, the Trinity Island Restoration Project was proposed by Coastal Operations staff at the CWPPRA Regional Planning Team meeting. The project received support but was not selected during the "Coast-wide Electronic Votes" for further consideration. Coastal Operations staff will continue to work with potential sponsors for submission of future projects on the refuge.

Coastal Operations staff burned a portion of Trinity Island in December to promote growth of more desirable vegetation and maintain health of the island.

Staff worked with a Texas Gas Transmission, LLC. contractor to ensure that removal of an abandon pipeline on Trinity Island did not negatively impact the refuge.


Students from Nicholls State University preparing seedlings and planting Black Mangroves at Raccoon Island on Isle Dernieres Barrier Islands Refuge.

LAKE BOEUF WMA

Lake Boeuf WMA is an 802-acre WMA located in Lafourche Parish just south of Lake Boeuf. This WMA is dominated by cypress/tupelo swamp and has an extensive freshwater marsh dominated by bull tongue and maiden cane.

LDWF staff reviewed a final proposal from the North Lafourche Levee District to dredge out canals adjacent to the WMA to improve drainage for the surrounding area. The canals proposed for dredging are 40 Arpent, 80 Arpent, East Theriot, Sam Foret and Halpin Canals.

Deer Season

Self-clearing permits revealed that 58 hunter efforts were made with one deer (doe) harvested.

Hog Season

Self-clearing permits revealed that no hunter efforts were made.

Alligator Season

A total of six alligator tags were issued to Lake Boeuf WMA lottery alligator hunters for the 2017 season. A total of five tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

MARSH ISLAND REFUGE

Marsh Island Refuge is a 76,664-acre refuge located in southern Iberia Parish. The refuge was donated to the state in 1920 making it one of the oldest and largest refuges in Louisiana. The refuge was donated to LDWF by the Russell Sage Foundation which was established by Margaret Olivia Sage in honor of her late husband. The donation came with a strict set of management stipulations which are audited annually by the Russell Sage Foundation.

USDA-NRCS, U.S. Environmental Protection Agency and Coastal Operations staff continued to pursue funding for restoration work at the refuge via the CWPPRA Program. During FY 2017-2018, the Southeast Marsh Island Marsh Creation and Nourishment Project was proposed by the U.S. Environmental Protection Agency at the CWPPRA Regional Planning Team and Technical Committee meetings. The project made it through the "Coast-wide Electronic Votes" for further consideration but failed to make it through the Technical Committee Phase 1 voting. Coastal Operations staff provided technical, field and logistical support for the project and will continue to work with potential sponsors for submission of future projects. LDWF anticipates that new projects on the refuge will be proposed next year.

Coastal Operations staff provided support and worked closely with Ducks Unlimited to submit a NAWCA funding proposal to replace three water control structures for the Northeast Management Unit in FY 2017-2018. This project was selected for NAWCA funding and will help ensure proper management of over 2,000 acres just east and south of the headquarters. Construction is expected to begin during late FY 2018-2019.

LDWF continued to pursue improvement to facilities and infrastructure at Marsh Island Refuge headquarters during FY 2017-2018:

- LDWF continued to work with Facility Planning and Control (FP&C) and the Governor's Office of Homeland Security and Emergency Preparedness to move the Marsh Island FEMA Boatsheds, Living Quarters and Airboat Shed Projects (previously Marsh Island FEMA Consolidation Project) forward. The Governor's Office of Homeland Security and Emergency Preparedness requested approval from FEMA last fiscal year for the living quarters location/footprint and to include boatshed foundation/bulkhead replacement. Staff continues to await FEMA approvals. FP&C agreed to allow the designer to begin designing the buildings. Coastal Operations staff commented on design drawings provided by the designer. The Quonset boatshed was demolished by Coastal Operations staff in September due to safety concerns.
- Coastal Operations staff continued to work with the designer on Phase 1 of the Marsh Island Master Plan to replace approximately 560 feet of bulkhead on the eastern portion of the headquarters island. Design was completed and bids were advertised at the end of last fiscal year. Leblanc Marine was awarded the contract. The contractor began work in September 2017 and continued through the end of FY 2017-2018. All major items have been completed. The remaining small issues should be completed soon.
- Coastal Operations staff repaired a portion of the bulkhead near the generator shed.

Multiple restoration and research projects on the refuge are in the planning stages, underway or in the monitoring stages:

- Marsh Island staff continued to maintain the Bayou Platte Bird Islands for optimal nesting conditions this year. However, a high tidal event in May/June reduced nesting significantly on these islands. Staff anticipates nest production to return to normal next year if nesting conditions are favorable. This rookery is the largest known gull-billed tern colony and the largest artificial rookery in Louisiana.
- Coastal Operations staff continued to work with FP&C and the designer in developing the Marsh Island Water Control Structure Capital Outlay project. This project is to replace an eight-barrel water control structure in the Big Impoundment (west). Geotechnical surveys and analysis were conducted in FY 2017-2018. Project design is complete and bidding should take place during next fiscal year.
- Coastal Operations heavy equipment operators dredged portions of Bayou Blanc/Lake Blanc to ensure vessel/user access. Dredge material was used to create terraces in Lake Blanc to assist with erosion issues.
- The USDA-NRCS, the Soil and Water Conservation District and LDWF conducted planting efforts again in FY 2017-2018. Approximately 9,800 plugs of smooth cordgrass were planted on the newly created terraces in Lake Blanc. These plantings will help protect marsh areas surrounding Lake Blanc.
- CPRA and Coastal Operations staff conducted annual inspections, including vegetative sampling and elevation surveys, for the TV-14 and TV-21 projects.
- Coastal Operations heavy equipment operators repaired two breaches/plugs in bayous north of the Gordy Dam. These breaches were allowing water to exchange freely with Vermilion Bay and bypass water control structures. This contributed to inefficiencies in proper management of the unit.
- American oystercatcher surveys continued on the refuge in FY 2017-2018. Staff also made several attempts to capture and band mottled ducks this year on the refuge but were largely unsuccessful due to the low numbers present.
- Refuge staff prescribe burned less than 2,000 acres this year to provide improved habitat conditions for wintering geese and reduce fuel loads to minimize wildfires. Burned acreage was reduced this year due to poor burning conditions and effective burns in prior years.

ABOVE: *New bulkhead being installed at the Marsh Island Refuge Headquarters.*
BELOW: *Contractors beginning work to repair a bulkhead that was damaged during the installation of the new bulkhead at the Marsh Island Refuge Headquarters.*

The refuge hosted multiple research, monitoring and educational projects including:

- Nicholls State University and the U.S. Environmental Protection Agency conducted coast-wide wetland vegetative sampling on the refuge.
- Rockefeller Refuge staff and LSU students accessed the refuge to collect data for seabird nesting habitat research. Marsh Island staff assisted with accessing and the marking of skimmer and tern nests on the Bayou Platte Bird Islands and Southwest Pass Shell Rakes.

Due to conflicts with and safety concerns for refuge users, 17 nuisance alligators were removed from various water control structures on the refuge (four at Belly Dam, six at Big Dam and seven at Gordy Dam).

Refuge staff posted and maintained boundary signs throughout the year and continued to maintain the headquarters, grounds, facilities and public use areas. Coastal Operations staff were forced to relocate Marsh Island boats (to a new boat shed rental location) and bulk fuel tanks due to future sale of current boat shed/bulk fuel dock rental location. Coastal Operations staff also installed channel markers to assist refuge users with navigation of Bayou Blanc, Lake Blanc, Lake Tom, Bird Island Bayou and Oyster Lake.

LDWF staff performing dredging in Bayou/Lake Blanc to improved public access to the interior of Marsh Island Refuge.

Recreational use of the refuge totaled approximately 11,743 visitors.

PASS-A-LOUTRE WMA

Pass-a-Loutre WMA is 115,000 acres and was established in 1921 by an act of State Legislature. It was designated as a "state shooting ground" which was the precursor to today's WMA. It is Louisiana's oldest WMA and one of the first in the country. Pass-a-Loutre WMA was Governor John Parker's response to public outcry that the best hunting areas were all being leased by wealthy hunters, and that the common man did not have quality hunting opportunities. The WMA is dominated by freshwater Roseau cane marsh and fringed by a brackish vegetation community. The WMA lies within the Mississippi River Delta in Plaquemines Parish.

Pass-a-Loutre WMA has historically been a hotspot for mineral exploration and production. WMA staff continued to monitor mineral facilities and when appropriate respond to oil spills on the Mississippi River Delta. WMA staff work very closely with the Mineral Management and Oil Spill Programs on many projects such as construction and maintenance of production facilities, drilling of new wells, plug and abandonment projects to remove decommissioned infrastructure, oil spill response, etc. Pass-a-Loutre WMA staff also assists with any necessary planning and permitting associated with these projects.

Coastal Operations staff continued to coordinate with USACE related to maintenance dredging operations in the lower Mississippi River federally authorized navigation channels. The USACE began pumping sediment from the Head of Passes Dredge Disposal Area in September 2017 into the Sawdust Bend area on Pass-a-Loutre WMA. Upon completion 3.5-4 million cubic yards of dredge material was placed in the Sawdust Bend area covering approximately 400 acres of varying elevations. The newly created land as a result of this project created much needed habitat for nesting waterfowl, upland game and colonial nesting birds; additionally, this area is accessible to the public for their enjoyment. USACE staff continues to be hopeful to secure funding to re-dredge South Pass in the coming years. If this occurs, a considerable amount of marsh creation will occur on the WMA.

There are a few restoration projects that were implemented or designed this year:

- Coastal Operations staff completed repairs to the final segment of levee on the Freshwater Reservoir Water Management Unit adjacent to Dennis Pass that was not previously repaired by the contractor. These repairs will allow LDWF staff to effectively manipulate water levels in the management unit during key times of the year to promote vegetation growth vital to over-wintering waterfowl.
- Pass-a-Loutre WMA staff began working on an experimental project designed to increase the life expectancy and effectiveness of crevasses.

Weeks Marine pumping dredge material from the Hopper Dredge Disposal Area to the Sawdust Bend area on Pass-a-Loutre WMA.

Crevasses are man-made cuts in river or canal embankments designed to allow the conveyance of water and sediment into an area that has been cut off to such influence either by natural or man-made processes. The goal of crevasses are to provide sediment input and decrease water depths. This will subsequently promote the growth of submerged aquatic vegetation (waterfowl forage, fish nurseries, fish habitat, etc.) and build land. Crevasses will silt in over time, become ineffective and must be cleaned out by mechanical means.

Pass-a-Loutre WMA biologist banding a black-bellied whistling duck.

Pass-a-Loutre staff have implemented this project to investigate whether or not the use of vegetative plantings along crevasse embankments will effectively direct water flow back to the middle of the channel to promote scouring and subsequently prolong the period of time until crevasses naturally silt in.

- LDWF staff began developing plans for several new crevasses as well as cleanouts of existing crevasses. Various funding sources will be utilized to fund the implementation of these projects in the coming years such as MR-09 Delta-Wide Crevasses (CWPPRA) and NRDA funds via the Louisiana Oil Spill Coordinator's Office.
- 2010 *Deepwater Horizon* oil spill settlement funds will pay for engineering, design and construction of multiple recreational use and enhancement projects on Coastal Operations WMAs. See the following list of such projects on Pass-a-Loutre WMA:
  - Campground improvements including the installation of new picnic tables, BBQ pits and fire rings (South Pass, Cadro Pass, Loomis #1, Loomis #2 and Southeast Pass campgrounds). Other improvements will be the installation of new and/or additional docks (South Pass, Cadro Pass, Loomis #1, Loomis #2 and Southeast Pass campgrounds). Additional improvements include dredging to improve access to South Pass, Loomis #2 and Southeast Pass campgrounds and construction of a bulkhead at the South Pass campground to reduce erosion.
  - Five new crevasses will be constructed on the WMA to improve public access and create new wetlands. These new crevasses will be located off of South, Loomis, Johnson, Chenerie and Southeast Passes.
- Pass-a-Loutre WMA staff assisted Restore the Earth Foundation and volunteers with the planting of a total of 400 bald cypress and water tupelo trees.

Improvements and maintenance to WMA facilities/infrastructure continued this year. Some of the larger projects underway or completed are as follows:

- The Coastal Operations heavy equipment staff cleaned out the entrance to the South Pass campground. Shoaling in this area was preventing adequate public access to the campground and other parts of the WMA. In addition, the channel was marked with PVC markers to assist the public with navigation to the campground.
- Pass-a-Loutre WMA staff maintained the shooting lanes and trails and planted food plots and summer crops. The food plots were planted to supplement the dietary needs of deer on the WMA.
- The Venice lot used to store boats, trailers and other equipment was cleared, leveled and topped with limestone as well as fenced in to provide a secure storage site.

***LEFT:** LSU AgCenter staff surveying Roseau cane for the presence of the Roseau cane scale on Pass-a-Loutre WMA. **RIGHT:** Volunteers working with Restore the Earth planted nearly 400 Cypress and Tupelo trees on Pass-a-Loutre WMA.*

- The Pass-a-Loutre WMA headquarters roof and associated interior leak damages were repaired by a contractor in FY 2017-2018.
- WMA staff maintained boundary markers throughout the WMA and the limited access area this year to clearly delineate the public/private land boundaries. In addition, administrative and legal staff continued discussions with the Delesdernier Heirs over a disputed boundary line at the corner of Pass-a-Loutre and Southeast Pass. This matter continues to be ongoing.

The Pass-a-Loutre WMA headquarters continued to serve as a field facility for multi-day field meetings, university research and educational events. This year the facility hosted numerous guests including but not limited to Loyola researchers collecting data for a larval blue crab study and LSU ecological students gaining field experience as part of college course work. The facility also hosted a wide variety of LDWF employees such as LDWF Enforcement Division staff conducting patrols and Office of Fisheries staff collecting fisheries data. Coastal Operations staff provided housing, logistical support, and/or information about Pass-a-Loutre WMA for these events.

Several research/monitoring projects are underway on the WMA including the following:

- Fisheries Research and WMA Monitoring (Loyola University)
- In November 2016, Pass-a-Loutre WMA staff and neighboring property owners noticed a significant die-back in Roseau cane which prompted discussions and eventual monitoring and research on the cause of this die-back. Researchers from the LSU AgCenter have determined that a new insect to the United States, Roseau cane scale (Nipponaclerda biwakoensis), has begun to infest the Roseau cane and may be a contributing factor to the die-back. LSU AgCenter, with help from LDWF and USFWS, has begun an extensive monitoring program in the field to monitor the progression of the scale. LSU AgCenter is also conducting laboratory testing to hopefully determine other factors contributing to the die-back and possible solutions to combating the scale. LDWF has provided logistical and technical support for all of the sampling efforts related to the Roseau cane die-back. Pass-a-Loutre staff continues to provide logistical support and equipment use for this project. In addition, Pass-a-Loutre staff implemented a photo monitoring project to show changes in stand densities and visual appearance of the affected Roseau cane. LDWF also worked the USDA-NRCS and LSU AgCenter to secure funding through LA-39 (CWPPRA) to plant several species of wetland plants in areas that were affected by the Roseau cane die-off in order to determine the feasibility of utilizing different plant species to revegetate areas that were affected; these plantings should be conducted early in FY 2018-2019.

WMA staff made a few attempts to band waterfowl and gallinule on the WMA this year, but were unsuccessful. Efforts to band black-bellied whistling-ducks were much more successful than in years past; over 200 black-bellied whistling ducks were trapped via walk-in traps and subsequently banded.

The headquarters recorded approximately 416 visitors this year. Recreational use of the WMA was estimated to be 27,000 visitors.

Hunting Statistics

Teal Season

During the five bag checks conducted this year an estimated 70 hunters harvested 109 teal for an average success of 1.6 teal per hunter.

Waterfowl Season

An estimated 665 hunters using the WMA during the 10 waterfowl bag check dates averaged 3.7 ducks per hunter effort. The limited access area averaged 5 ducks per hunter effort. The top three species harvested were blue-winged teal, gadwall and green-winged teal. Hunters also harvested 134 coots, three mergansers and 15 snow geese.

Deer Season

Self-clearing permits revealed that 59 hunter efforts were made to harvest six deer (three does, three bucks). This equates to one deer per 9.8 efforts.

LEFT: *LDWF staff refurbishing the remainder of the Freshwater Reservoir levee on Pass-a-Loutre WMA.* ***RIGHT:*** *WMA staff planting black willow along the edge of a crevasse to promote channel scouring on Pass-a-Loutre WMA.*

Hog Season

Hunter interviews and self-clearing permits recorded 139 hunter attempts which resulted in the harvest of 13 hogs for a success of one hog for every 10.7 hunts.

Alligator Season

A total of 374 alligator tags were issued to Pass-a-Loutre WMA commercial (350 tags) and lottery (24 tags) alligator hunters for the 2017 season. A total of 150 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

POINTE-AUX-CHENES WMA

Pointe-aux-Chenes WMA is a 33,488-acre WMA located in southern Terrebonne and Lafourche parishes. It was purchased from the Exxon Company in 1968 at a cost of $21 per acre and marked the first purchase of marsh land by the Wildlife and Fisheries Commission. It was purchased along with Salvador WMA. The habitat of this WMA is primarily brackish and intermediate marsh dominated by smooth cordgrass and wire grass. Point Farm is a 1,000-acre bottomland hardwood ridge that is also located on the WMA.

ABOVE: *LA DOTD workers constructing a new bridge to the Pointe-aux-Chenes headquarters.*
RIGHT: *Weeks Marine dredging Grand Bayou for construction of Reach K of the Morganza to the Gulf levee on Pointe-aux-Chenes WMA.*

Terrebonne Levee and Conservation District continued to design and construct flood protection and mitigation projects on the WMA. LDWF staff frequently coordinated with Terrebonne Levee and Conservation District staff regarding these projects. Some of the accomplishments of the Terrebonne Levee and Conservation District include:

- Terrebonne Levee and Conservation District and the South Lafourche Levee District continued to design, construct and lift portions of the J, K and L Reaches of the "Morganza to the Gulf" hurricane protection levee during FY 2017-2018. These reaches are all the portions of the levee within the WMA. This included lifting elevations on two of the Grand Bayou water control structures. The Terrebonne Levee and Conservation District also began constructing turn around areas for vehicles/equipment in Reach J.
- Terrebonne Levee and Conservation District continued building terraces primarily in and around the Pointe-aux-Chenes/Ducks Unlimited and Grand Bayou units. These terraces are built as mitigation for wetland impacts from several levee projects.

LDWF acquired surface leases with Apache Louisiana Minerals LLC. and the Louisiana Land and Exploration Co. LLC. (neighboring landowners) for the 100 feet south of Island Road. This acreage will be added to the WMA and will assist with current enforcement issues.

Multiple restoration projects were completed or were in the planning phase this year. The following list contains some of the larger projects:

- Ducks Unlimited obtained funding for the creation of the moist soil unit project on the lower end of Point Farm and are waiting notification on whether they will receive additional National Fish and Wildlife Foundation funding. Ducks Unlimited and Coastal Operations staff continued to develop plans for this project.
- Coastal Operations staff continued to work with FP&C and the designer on the capital outlay project to replace and/or repair the S1 and S3 water control structures on the Pointe-aux-Chenes Water Management Unit. The permit to modify the orientation of the S3 water control structure (to increase input of freshwater in the unit) was received from the USACE in March 2018.

Pointe-aux-Chenes WMA staff continued to work closely with Restore the Earth Foundation for additional bald cypress plantings and other restoration/enhancement projects on the WMA.

LDWF entered into a memorandum of understanding with Resource Environmental Solutions, LLC. to plant 100 acres of bald cypress trees in the Pointe-aux-Chenes Unit during next fiscal year.

Coastal Operations staff continue to allocate much time to coordinating improvements, maintenance and repairs to facilities/infrastructure at Pointe-aux-Chenes WMA in FY 2017-2018. Coastal Operations staff continued to make progress on multiple projects. Some of the larger projects underway or completed are as follows:

- The Quonset Hut Replacement Project was delayed last fiscal year after it was discovered that the Pointe-aux-Chenes WMA headquarters bridge had to be replaced (due to deterioration and weight

capacity issues). Coastal Operations staff will work with FP&C and the designer to re-bid this project in FY 2018-2019, after bridge replacement is complete.

- The Louisiana Department of Transportation and Development completed headquarters bridge replacement (via CEA) in June 2018. Coastal Operations staff assisted with this project via equipment rental and traffic control.
- Coastal Operations staff have continued to work tirelessly with FP&C and the designer on a project to renovate the existing WMA headquarters facility. However, due to continued arising issues, the plan to renovate the existing office/dorm building continues to move forward slowly.

Pointe-aux-Chenes WMA staff spent a considerable amount of time preparing for hunting season at Point Farm. Staff prepared, planted and fertilized the dove fields and planted food plots for deer season. Rain associated with Hurricane Harvey later flooded dove fields. Staff also prepared and conducted youth lottery deer hunts on Point Farm. However, youth lottery deer hunts were cancelled for the first weekend due to severe weather associated with Hurricane Nate.

Mineral activities were minimal in FY 2017-2018, the main project included the drilling of a natural gas well south of Unit Four near Bully Camp by Key Operating and Production. The well has been complete but is not in production at this time.

Pointe-aux-Chenes WMA staff and students expended time banding mottled ducks and mourning doves during the summer. Mottled duck efforts included nighttime airboat capture attempts on the WMA as well as a baited rocket net site on Point Farm. Although only 20 mottled ducks were banded at Pointe-aux-Chenes WMA this year, the students gained a lot of knowledge on how the baiting and banding processes are accomplished. In addition to banding waterfowl, WMA staff and the students banded mourning doves as well.

2010 *Deepwater Horizon* oil spill settlement funds will pay for engineering, design and construction of multiple recreational use and enhancement projects on Coastal Operations WMAs. See the following list of such projects on Pointe-aux-Chenes WMA:

- Construct three boat/pirogue pullovers (two in Montegut Unit, one in N. PAC Unit)
- Repair Island Road boat launch and parking lot and construct three boat docks

TOP: *2017 waterfowl season opening day sunrise at Pointe-aux-Chenes WMA.*
CENTER: *Happy hunters showing off their take from opening day on Pointe-aux-Chenes WMA.*
BOTTOM: *Youth hunters and their chaperones preparing to be brought to their deer stands by Pointe-aux-Chenes WMA staff.*

- Construct five parking areas adjacent to Island Road
- Construct 17 fishing piers (two in Montegut Unit, two in PAC Unit, three in Grand Bayou Unit, 10 adjacent to Island Road parking areas)

Recreational use of the WMA was estimated at 31,250 users.

Hunter Statistics

Teal Season
During the five bag checks conducted this year an estimated 545 hunters harvested 674 teal for an average success of 1.2 teal per hunter effort.

Waterfowl Season
During the 11 waterfowl checks conducted for the season an estimated 1,383 hunters had an average success of 2.5 ducks per hunter attempt. The top three species harvested were lesser scaup, blue-winged teal and green-winged teal. Hunters also harvested 1,570 coots, 97 gallinules, 10 mergansers, one rail and two geese. Hunters using the Montegut and Pointe-aux-Chenes limited access areas continued to have better success than non-limited access area hunters. The limited access areas averaged 3.2 ducks per hunter while the rest of the WMA averaged 2.5 ducks per hunter.

Deer Season
There were 55 bow hunt efforts reported on self-clearing permits and 17 lottery youth hunt efforts. There was one harvested deer (doe) reported by self-clearing permits and one deer (buck) harvested in the lottery youth hunts. This equates to one deer per 36 hunter efforts.

Hog Season
Twenty-two hunter efforts revealed by self-clearing permits and 17 youth hunt efforts resulted in the harvest of four hogs. This equates to one hog per 9.8 hunter efforts.

Dove Season
Hunter surveys on opening day revealed that 68 hunter efforts resulted in the harvest of 52 doves for an average of 0.76 doves per effort.

Rabbit Season
Self-clearing permit data showed 60 reported efforts resulting in 29 rabbits harvested for an average success of 0.5 rabbit per effort.

Squirrel Season
Self-clearing permit data showed 124 reported efforts resulting in 152 squirrels harvested for an average success of 1.2 squirrels per effort.

Alligator Season
A total of 228 alligator tags were issued to Pointe-aux-Chenes WMA commercial (198 tags) and lottery (30 tags) alligator hunters for the 2017 season. A total of 158 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

SALVADOR/TIMKEN WMAs
Salvador WMA is a 35,121-acre WMA located in southern St. Charles Parish. It was purchased from Exxon in 1968 at a cost of $21 per acre, and marked the first purchase of marsh land by the Wildlife and Fisheries Commission. It was purchased along with Pointe-aux-Chenes WMA. This WMA is a freshwater marsh dominated by bull-tongue and maiden cane. Just to the east of Salvador is the 3,920-acre Timken WMA. It is owned by the New Orleans City Park Improvement Association and has been leased to LDWF since 1995. Both of these WMAs are currently the beneficiary of one of the largest restoration projects in the state. The Davis Pond Freshwater Diversion Project diverts freshwater from the Mississippi River into the northern portion of Salvador WMA then drains into Lake Cataouatche.

LDWF staff and Ducks Unlimited finalized the acquisition of a new tract of land to be added to the WMA this year. The White Tract is an approximately 1,700 acre tract on the northeast border of Salvador WMA. The tract was purchased using NAWCA funds, LDWF funds and private donations. Staff adjusted the WMA, posted property boundaries and updated the WMA map to include the newly acquired tract.

LDWF and FP&C staff continued to work together to move forward projects associated with the buildings at the headquarters facility at Salvador WMA. LDWF and FP&C plan to use available FEMA funds from multiple project worksheets to renovate the "Caretaker's Camp" (i.e., current living quarters). In tandem with the FEMA project, LDWF plans to use operating budget to repair the boat house and construct a new generator shed/fuel dock. Coastal Operations staff continued to provide input and comments on project designs, plans and specifications. Coastal Operations staff plan to demolish all deteriorated buildings at the facility such as the old headquarters, tractor shed and tool shed in the future.

Coastal Operations staff continued working with the USACE on potential mitigation projects for the USACE Hurricane Protection Levee System for the West Bank of St. Charles, Jefferson and Plaquemines parishes. Project proposals included the potential creation of several hundred acres of fresh marsh, swamp and bottom land hardwood habitats on the WMAs. This project is still only in the early development stages and still has many hurdles to overcome before implementation.

Coastal Operations staff based at Pointe-aux-Chenes WMA continued to maintain the facilities and equipment at Salvador WMA. Staff visited the WMA headquarters to perform needed work such as yard maintenance, building repairs and improvements, and generator maintenance. Staff also replaced numerous missing boundary signs at the WMAs and posted the increased restricted area adjacent to the Salvador headquarters.

An estimated 10,870 recreational users visited the WMAs this year.

Hunting Statistics

Teal Season
During the five bag checks conducted this year an estimated 85 hunters harvested 59 teal for an average success of 0.7 teal per hunter effort.

Waterfowl Season
During the 11 waterfowl bag checks conducted this season an estimated 385 hunters averaged 2.2 ducks per hunter effort. This year the areas of the WMA outside of the Davis Pond and Tank Pond areas had the highest success rates. The top three duck species harvested were lesser scaup, blue-winged teal and ring-necked duck. Hunters also harvested an estimated 40 coots, 315 gallinules and five mergansers during bag checks.

Deer Season
Self-clearing permit data showed that 149 hunter efforts resulted in the harvest of six deer (four bucks, two does). Hunter success was one deer per 24.8 efforts.

Hog Season
Self-clearing permits revealed that there was six hunter efforts and no harvest of hogs for FY 2017-2018.

Rabbit Season
Self-clearing permit data showed 17 reported efforts resulting in six rabbits harvested for an average success of one rabbit per 2.8 efforts.

Frogging Season

There is an experimental night-time activity season on Salvador and Timken WMAs that is open from June 1 - Aug. 15. During the 2017 season 133 users completed a self-clearing permit indicating they were participating in frogging activities and reported harvesting 63 frogs. This equates to 0.5 frogs per effort.

Alligator Season

A total of 258 alligator tags were issued to Salvador/Timken WMA commercial (228 tags) and lottery (30 tags) alligator hunters for the 2017 season. A total of 245 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

ST. TAMMANY REFUGE

St. Tammany Refuge is a 1,310-acre refuge located on the north shore of Lake Pontchartrain in St. Tammany Parish. The refuge was purchased by the state in 1935 from the Great Southern Lumber Co. The refuge is managed in cooperation with the USFWS along with Big Branch National Wildlife Refuge.

USFWS pursued funding for restoration work on and adjacent to the refuge via the CWPPRA program. During FY 2017-2018, the Bayou Cane Marsh Creation Project was proposed at the CWPPRA Regional Planning Team and Technical Committee meetings. The project made it through the "Coast-wide Electronic Votes" and the Technical Committee Phase 1 voting for further consideration. This project was voted through during the Technical Committee Phase 2 meeting in December 2017. In February 2018 the CWPPRA Task Force voted to move this project into engineering and design and allocated $3.2 million in initial costs for the engineering and design work. LDWF supported this project and provided assistance as needed.

Due to USFWS' oversight, Coastal Operations staff had relatively little participation in the daily management of the refuge in FY 2017-2018.

Alligator Season

Ten alligator tags were issued (one hunter) for St. Tammany Refuge for the 2017 season. All 10 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

STATE WILDLIFE REFUGE

State Wildlife Refuge is a 13,000-acre refuge located in southern Vermilion Parish. It was donated to the state in 1911 by Mr. Edward McIlhenny and Mr. Charles Ward to be managed as a wildlife refuge. This is the oldest refuge in the state and one of the oldest in the country.

Coastal Operations staff continued to support efforts to repair/replace infrastructure at State Wildlife headquarters that was damaged during hurricanes Rita and Ike. Staff continued to work with FP&C on repairs of the small and large boat sheds and the lookout tower as well as the replacement of the tractor, tool, trapper's and pump sheds. FEMA approved building consolidation for the tractor, tool and trapper's sheds in March 2018. Staff awaits contract amendment for the designer. Design should begin during FY 2018-2019.

Coastal Operations staff discovered a sheet pile failure on the Tom's Bayou water control structure. Staff made several trips to the site and multiple correspondence with Ducks Unlimited and the contractor to assess and discuss failure issues. Coastal Operations staff repaired sheet pile failures and constructed a new fishing dock on the Tom's Bayou water control structure in April and May.

Coastal Operations staff participated in an annual operations and maintenance inspection trip of the Lake Portage Land Bridge CWPPRA Project (TV-17). The project has successfully maintained itself over the years and there are no current plans for any modifications or repairs.

Coastal Operations staff based at Marsh Island Refuge continued to maintain the facilities and equipment at State Wildlife Refuge. Staff routinely visited the refuge to perform needed work such as maintenance to facilities, grounds, water control structures and public use areas.

An estimated 8,500 recreational users visited the refuge this year.

LEFT: *LDWF Heavy Equipment staff installing a repair structure on the Prien Bayou Weir at State Wildlife Refuge.* ***RIGHT:*** *Completed Prien Bayou Weir and Fishing Pier at State Wildlife Refuge.*

HUNTER EDUCATION

Conservation education is a vital part of the LDWF mission. The Education Program is a component of the Office of Wildlife and focuses on two main areas: Hunter Education and General Wildlife Education/Outdoor Skill Development.

Staffing for the Education Program consists of 12 educators who work in the field, four supervisors who have field responsibility in addition to their supervisory duties, one hunting heritage coordinator, one administrative specialist, one education manager, and one education program manager. Three full time and one part time wildlife technicians staff LDWF-operated shooting ranges, and one maintenance repairer is responsible for maintenance of an education facility, including a shotgun and air rifle range.

HUNTER EDUCATION

Hunter and bow-hunter education classes cover firearm safety and operation, hunting ethics, principles of wildlife management, outdoor survival and tree-stand safety. Hunter education certification is mandatory for hunters born on or after Sept. 1, 1969. There are exceptions to the hunter education requirement that allow persons to hunt without hunter education certification if they are directly supervised by someone 18 or older with hunter education certification or by a licensed hunter born prior to Sept. 1, 1969. An exemption is also provided for persons with a current POST certification or military experience, and a hunter education exemption card is issued to those who qualify. Most states have mandatory hunter education requirements, and these exemptions, including the POST/military exemption, apply only in Louisiana. The regular Louisiana hunter education certification card is honored in all 50 states.

Students have two options for taking a hunter education class. The classroom course consists of 10 hours of instruction, usually spread over two to three days. The online course consists of an interactive internet course that the student can complete at home and is followed by a mandatory four-to-six-hour field day event. The field day reinforces the lessons learned in the online course and provides an opportunity for hands-on learning. Both the classroom course and the online/field day include a live-fire exercise where students must demonstrate that they can safely handle and discharge a firearm.

Hunter education classes are taught by Education Program staff and a network of volunteer instructors. There are approximately 950 active volunteer hunter education instructors in Louisiana. Volunteer instructors complete an instructor training course and background check prior to being certified. Education Program staff coordinate the delivery of classes with volunteers, recruit and train volunteer instructors and keep volunteer instructors supplied with materials to teach classes. In FY 2017-2018, 62 new volunteer instructors were trained through five instructor courses. A volunteer instructor workshop was held at Camp Grant Walker in Pollock, Louisiana, with 167 instructors in attendance. Service and performance awards were presented to volunteer instructors. The time volunteered by hunter education instructors, volunteer range officers and Archery in Louisiana Schools coaches to deliver hunter education classes, shooting range operation and train archers is used as in-kind match for the hunter education federal grant. In FY 2017-2018, volunteers contributed 32,783 hours of service time.

STUDENT CERTIFICATION

Total hunter education certifications experienced a slight decline from last fiscal year (11,256 versus 11,624 in FY 2016-2017). The online/field day course remains popular as the proportion of students choosing this option remains above 25 percent. Demand for bow-hunter education remains low as this requirement is no longer mandatory to hunt with archery equipment on national wildlife refuges in Louisiana.

HUNTER EDUCATION

LA Hunter Education Courses FY 2017-2018			
Course Type	**No. of Courses**	**No. of Students**	**Percentile**
Classroom Course	299	8,178	73%
Home Study/ Field Day	117	3,078	27%
Total	*416*	*11,256*	

BOWHUNTER EDUCATION

Five bow-hunter education classes were offered, with 61 students certified.

HUNTING INCIDENTS

During FY 2017-2018, there were 10 reported hunting incidents involving injury or death. Two of the 10 resulted in fatalities. Two of the incidents involved falls from an elevated stand with the remainder involving firearms. Incidents were compiled and entered into the International Hunter Education Incident Database. Information on these incidents was presented to instructors at the Volunteer Instructor Workshop. Education Program staff and volunteer instructors are placing additional emphasis on tree-stand safety in their hunter education classes and field days.

Primary causes for these incidents were as follows:

Hunting Incidents (FY 2017-2018)	
Type	**No. of Incidents**
Careless Handling of Firearm	2
Loading/Unloading Firearm	1
Failure to Check Beyond Target	2
Failure to Identify Target	1
Shooter Swinging on Game	1
Use of Intoxicants/Drugs	1
Fall While Climbing in/out of Position	2
Total Incidents	***10***

SHOOTING RANGE/ TRAINING FACILITIES

Two education centers and four shooting ranges are available to the public and managed by the LDWF Education Program. In 2017-2018, professional range engineering services were contracted to conduct range safety analyses to determine future construction needs.

BODCAU SHOOTING RANGE

The Bodcau range is located in Bossier Parish on the Bodcau WMA. Accommodations for public use include 13 rifle and 18 pistol shooting positions and a shotgun range with four manual clay target throwers. The range is open to the public three days a week and recorded 9,114 user visits in FY 2017-2018.

WOODWORTH EDUCATION CENTER

The Woodworth Education Center located in Rapides Parish contains a classroom, lodging facilities and a public shooting range. Range facilities consist of a rifle range, handgun range and a five-stand shotgun range. The range is open for public access four days a week, and recorded 8,757 user visits in FY 2017-2018.

SHERBURNE SHOOTING RANGE

Located in Pointe Coupee Parish on the Sherburne WMA, the Sherburne range consists of two shotgun ranges, one archery range, one handgun range and one rifle range. It is open to the public seven days per week and recorded 8,779 user visits in FY 2017-2018.

WADDILL OUTDOOR EDUCATION CENTER AND REFUGE

The Waddill Outdoor Education Center and Refuge in East Baton Rouge Parish provides an outdoor education environment in an urban setting. A classroom, shotgun range, archery range and air rifle range are used for hunter education instruction and recreational shooting opportunities. In August 2016, historic flooding along the Comite River inundated the property and flooded the facilities. The main classroom facility was repaired and returned to full functionality in FY 2017-2018.

HONEY ISLAND SHOOTING RANGE

The Honey Island Shooting range is located on the Pearl River WMA in St. Tammany Parish. The range is managed under an agreement with Southeast Louisiana Firearms Safety, Inc. Southeast Louisiana Firearms Safety, Inc. is a non-profit organization staffed by volunteers that maintains and operates the range for public use. Shotgun, rifle and handgun shooting opportunities are available to the public. The range is open to the public three days per week. There is a $6 per day fee to use the range that is collected by Southeast Louisiana Firearms Safety, Inc. to fund operation and maintenance of the range. This range recorded 17,223 user visits in FY 2017-2018.

GENERAL WILDLIFE EDUCATION AND OUTDOOR SKILL DEVELOPMENT

Education Program staff are involved in a variety hunter education related activities. Staff provide information and make presentations on topics of interest to civic organizations, school groups and others. Outdoor skill development programs and efforts have increased in recent years. Demand is high for programs that teach beginners about getting started in hunting and shooting sports. In recognition that funding and support for conservation are directly linked to hunters and shooters, the LDWF Education Program has expanded its efforts to recruit and teach skills to new outdoor enthusiasts.

NATIONAL HUNTING AND FISHING DAY

The general public is invited to join LDWF and other conservation partners in an open house atmosphere that involves hands-on activities and information about conservation. The Education Section provided training to the public in the safe use of firearms and archery equipment. Four LDWF-sponsored events were held at the following locations: Bodcau WMA, Monroe Field Office, Waddill Wildlife Refuge, and the Woodworth Outdoor Education Center.

BECOMING AN OUTDOORS WOMAN (BOW)

BOW is a popular program with women interested in learning about outdoor recreation. During the BOW weekend workshop, education staff and volunteers conduct classes on a variety of outdoor skills, including shooting, fishing, canoeing, hunting, orienteering, camping and wildlife appreciation. One BOW workshop was conducted in FY 2017-2018 with 132 participants and a Beyond BOW deer hunt was conducted on Floy McElroy WMA.

FAMILIES UNDERSTANDING NATURE (FUN) CAMP

Families Understanding Nature provides both fun and education to a parent and youth(s) through a weekend of staff-led outdoor activities. Family members are introduced to archery, rifle and shotgun shooting, kayaking, fishing and camping. The education staff conducted two FUN Camps during FY 2017-2018. One camp was Mother/Child and the other was Father/Child with a total of 52 participants.

ARCHERY IN LOUISIANA SCHOOLS (ALAS)

ALAS is Louisiana's version of the National Archery in the Schools Program. ALAS promotes international style target archery as part of the physical education curriculum for grades 4-12. At the end of FY 2017-2018, 107 active schools were participating in the program, impacting an estimated 22,943 students. Two regional and one state tournament were held last year. A 3-D competition was held as part of the state tournament format for the third time. Fifty-five schools participated in the regionals and 51 of these participated in the state tournament. Total tournament participation was 2,578 archers in the elementary, middle, and high school divisions.

Teams and individuals from Louisiana schools participated in the National Archery in the Schools Program National and World Tournaments (14 and five schools respectively). Louisiana schools had a strong showing at both tournaments with several schools placing in the top three of their respective divisions in both bulls-eye and 3-D competition.

Benton Elementary School archery team wins first place in the Elementary Division at the 2018 ALAS state tournament.

LOUISIANA HUNTING HERITAGE PROGRAM

The Louisiana Hunting Heritage Program is a program to recruit and develop new hunters by matching individuals who want to learn to hunt (apprentices) with experienced hunters (mentors). Many individuals have an interest in hunting but lack the social network to become involved. Once accepted in the program a pairing is made of an apprentice with a mentor who agrees to take the apprentice under their guidance. Since the program began 142 apprentices and 50 mentors have signed up, with five new pairings being made for FY 2017-2018.

LDWF staff Todd Buffington instructs participant on proper rifle sighting and shooting techniques.

A young National Hunting and Fishing Day participant learns to shoot an air rifle.

ENVIRONMENTAL EDUCATION & LITTER REDUCTION SECTION

This section, consisting of two full-time and one contractual staff member, acts on behalf of the governor-appointed Louisiana Environmental Education Commission (LEEC) and acts under the legal authority and funding granted in R.S. 30:2503 et seq. This section also receives grants and donations from outside funding sources in support of programming. In FY 2017-2018 the Environmental Education Section administered six primary programs: Grants, Green Schools, Professional Development, State Conference, Environmental Awareness Contest, and Outreach. It also oversees the Keep Louisiana Beautiful cooperative endeavor on behalf of the state. The primary objective of the Environmental Education Section is to provide current, accurate information and resources to PK-12 and post-secondary educators and students and to the general public throughout the state.

GRANTS PROGRAM

The LEEC Grants Program supports projects based on sound scientific principles, having an environmental focus, and impacting Louisiana students, educators or Louisiana issues. Teachers, university students and informal educators apply for these competitive mini-grants ranging from $1000 - $5000. Environmental Education staff solicits assistance from professionals in the greater science community to review and score the grants in a competitive, anonymous award process. Staff then monitors the grants and provides technical guidance and oversight as needed. Posters submitted by research students to various symposia are also monitored.

EDUCATOR GRANTS

Five educator grants implemented in FY 2017-2018 impacted a total of 1,053 Louisiana Pre-K through high school level students. Projects included the investigation of impacts from coastal land loss on animals, the study of human impacts as demonstrated through art, implementation of a schoolyard gardening program, environmental quality monitoring, and engagement in laboratory experiments focused on environmental impacts and sustainability. Fifty-one percent of the students were reported to be from economically disadvantaged families.

GREEN SCHOOL GRANTS

Green School grants support school-wide initiatives that fall under the broad categories of reducing environmental impacts and costs,

Research student studies thermoregulatory traits in the differential grasshopper

Students at Arthur Ashe learn how compost helps plants to grow.

improving student and staff health and wellness, and providing effective environmental and sustainability education. Five grants were completed during the FY 2017-2018 school year. Two of these grants were awarded during FY 2016-2017, while three were awarded in FY 2017-2018. Approximately 2,636 students were impacted by these grants on projects that included:

- Composting
- Hydroponics
- Recycling
- Gardening
- Nature trails
- Water quality testing and remediation
- Reduction of plastic water bottle use
- Increasing access to outdoor recreation.

PROFESSIONAL DEVELOPMENT GRANTS

Four professional development grants were implemented in FY 2017-2018, resulting in four day-long and two overnight workshops impacting a total of 50 educators. Teachers participated in wetlands activities, shark dissections and water quality testing. They also learned about citizen science opportunities for students and learned how to analyze real-time air quality data.

UNIVERSITY RESEARCH GRANTS

Seventeen university students attending Southeastern, LSU, UNO and Tulane conducted research supported by LEEC grants during FY 2017-2018. These students were also required to share their findings with PK-12 educators at the Louisiana Environmental Education Symposium. The research topics pursued, followed by professional presentation audiences, as appropriate, are:

- Growth responses of three wetland plant species to various levels of flooding and nutrients; presentations given at the Southeastern Ecology and Evolution conference, Basics of the Basin meeting, American Geophysical Union conference, Gulf of Mexico Oil Spill and Ecosystem Science conference
- Long-term population dynamics of an old-growth longleaf pine population
- A CURE for Invasive Species: Understanding invasive species competition in Louisiana milkweed communities; Ecological Society of America
- Differential gene expression in roots of *Spartina alterniflora* under oil pollution stress
- Social and environmental information used by foraging brown pelicans
- Individual and density-dependent movement of an insect within a patch, matrix and at the border; Ecological Society of America
- Biological control at a range margin: interactions between multiple agents and host genotypes
- Migration stopover ecology of the semipalmated sandpiper (*Calidris pusilla*) in the northern Gulf of Mexico
- Biomarker of resilience in *Crassostrea virginica*; Gulf of Mexico Climate and Resilience Community of Practice meeting, University of Louisiana Lafayette Graduate Student Symposium, Coastal Connections Competition, Benthics Ecology meeting in Corpus Christi, USGS Louisiana Coop Unit
- Genetics of a migratory bird population
- Temporal heterogeneity as a driver of microevolution of plasticity in thermotolerance in the differential grasshopper
- Impact of soil microbes on cogongrass growth in native and non-native soil; Biograds Symposium
- Determination of carbon sources in the Mississippi-Atchafalaya river system
- Interacting effects of disease and non-native milkweed species on the behavior and survival of monarch butterflies
- Effects of hurricanes, in the context of ongoing sea level rise, on plant communities in coastal transitions
- Assessment of sand storage of large channel bars in the Lower Mississippi River; Annual Louisiana Groundwater, Surface Water, and Water Resources Symposium
- Diversity in an invasive plant: a historic and contemporary perspective; featured on the UNO website

GREEN SCHOOLS

The Louisiana Green Schools program supports schools seeking to reduce their environmental impacts and costs, improve student and staff health and wellness, and provide effective environmental and sustainability education. The program's goals are achieved through administering of Green School Grants (as outlined above), providing professional development and outreach, and by administering the U.S. Department of Education Green Ribbon School Awards program for the state in partnership with the Louisiana Department of Education.

The Green Schools program provides information and technical assistance to educators, school administrators and custodial staff through field visits, phone calls, webinars, and emails. Additional professional development was offered to educators at the National Science Teachers Association Conference in New Orleans.

PROFESSIONAL DEVELOPMENT

LSSS WORKING GROUP

LEEC members, staff and the Louisiana Department of Education jointly hosted two day-long workshops for non-formal educators to introduce them to the new Louisiana Student Standards for Science. The 43 attendees in the first workshop learned how to interpret the new standards with discussions centering on the use of Science and Engineering Practices, Disciplinary Core Ideas and Crosscutting Concepts. Significant time was spent on the concept of phenomenon-based learning. Educators indicated that they would like more information, so the LEEC and Louisiana Department of Education organized a second workshop attended by 45 non-formal educators. Participants learned how to identify and develop quality phenomena for their programming, which was particularly helpful for state agency personnel.

WATERSHED WEBS

LDWF's Environmental Education staff secured a $90,000 NOAA grant to administer Watershed Webs, which was a three-year program aimed at educating teachers and students about watersheds and the impacts of trash in our waterways. This program, which concluded in the summer of 2018, included the development of the Watershed Experience Tracker (WET) app, development of classroom curriculum, teacher workshops, and student field experiences. FY 2017-2018 activities included the facilitation of student field experiences with participating teachers.

Participating Watershed Webs teachers of grades 5-12 qualified to have a similar one-day field experience conducted with their students. Environmental Education staff traveled to the schools' communities to help facilitate the field experiences. During FY 2017-2018, Environmental Education Section staff and grant contractors conducted four student field experiences for workshop attendees (Academy of Sacred Heart & St. John Berchmans, Messiah Montessori, St. Aloysius School, and Washington-Marion Magnet High) and two additional field experiences: one for students attending a Big Buddy men-

toring day camp and another for students at Episcopal School of Baton Rouge. More than 260 students took part in these field experiences. Students participating in these clean-ups collected more than 4,600 pieces of litter weighing in excess of 300 pounds from Louisiana waterways and beaches.

The field experiences began with a discussion about watersheds, including the Mississippi River and Atchafalaya watersheds down to the students' home watersheds; the pathways of debris to the Gulf of Mexico; and the non-point source nature of aquatic debris. The discussion was followed by a beach or waterway cleanup following a protocol developed by Environmental Education staff and contractors. Students and facilitators then sorted and weighed of debris, posted outcomes to an application developed by LDWF Environmental Education and GIS staff, and discussed outcomes. The Messiah Montessori field experience also included water quality data collection. Students collected water samples and then tested the samples for dissolved oxygen, temperature, pH and clarity. The process included a discussion about how each of these parameters impacts wildlife and the broader ecosystem influenced by these water conditions.

Student exhibitor at Environmental Education State Symposium.

CONFERENCE

Environmental Education staff organized and facilitated the annual Louisiana Environmental Education State Symposium, whose 2018 theme was "Green STEM Careers." This theme was chosen by LEEC to bring attention to the many environmental career pathways currently in or anticipated in Louisiana. This two-day symposium serves as the premier environmental education state conference for formal and non-formal environmental educators, science teachers, pre-teachers and government staff working in complementary fields. It is designed to stimulate new classroom ideas and techniques, provide an opportunity for educators to network, and offer additional information on resources, professional development and classroom or student opportunities. Approximately 210 educators were in attendance. The event included day-long short courses, concurrent sessions, exhibits and a keynote address.

SHORT COURSES

Four short courses were offered to participants as an option for Friday activities. "Diverting Disaster with the Old River Control Structure" toured the control structure and was facilitated by UNO educators Dinah Maygarden and Dr. Ivan Gill. "Integrate Local Earth and Environmental Science into Your STEM Curriculum" was hosted by Drs. Don Duggan-Haas and Robert Ross from the Paleontological Research Institution in Ithaca, New York. Keep Louisiana Beautiful presented the "Hows and Whys of Recycling," which included a tour of the Baton Rouge Recycling Center. Lastly, Bluebonnet Swamp educator Shannon Guidry facilitated the "BREC Nature Exploration Toolkit" workshop.

CONCURRENT SESSIONS

Twenty 50-minute concurrent sessions demonstrating hands-on activities, exemplary programs and lesson demonstrations were offered to pre-K through college level educators. Sessions offered:

- STEM Event Planning
- Let's Go Fishing
- Watch the Delta Grow
- Composting and Aquaponics
- Microplastics in the Environment
- Dissecting the new LA Science Standards
- Turnip the Heat
- Listen, Learn Lead - Empowering the Next Generation
- GIS Industry Based Certification
- It's FUN!
- Shining Light on Pollution
- Classifying Classroom Pets
- Using Picture Books in Environmental Education
- STEM Activities for a Sustainable Planet
- Supporting Student-directed Research on Coastal Topics
- Engaging High School Students in Future Water Quality Challenges
- There's a Marsh in my Backyard?
- Alligator Cuisine
- Journey 2050
- Climate Change Graphics, and Energy Efficiency: Making a Difference Can Start Early

In addition, a 50-minute round table with 12 mini-sessions to choose from was offered. The post-event evaluations scored excellent (4.7/5) overall.

EXHIBIT HALL

Twenty-seven exhibitors provided informational displays in the exhibit hall throughout the event. Seventeen university students displayed posters featuring their grant research during the Friday evening poster session. Ten high school students involved in the Young Environmental Science Stewards project with Ms. Maygarden exhibited and answered questions on their project as well. Thirty-five students from Harry Hurst Middle School exhibited on Saturday under the direction of teacher Barry Guillot. Environmental Education staff also implemented a STEM Careers activity for participants to quiz exhibitors on various STEM career facts found within their organization.

KEYNOTE AND AWARDS PROGRAM

Drs. Don Duggan-Haas and Robert Ross from the Paleontological Research Institution in Ithaca, New York delivered the keynote address. In a speech titled, "Fire and Brimstone and Fort McMurray: Reasons and Strategies for Talking about Climate Change," they relayed their experiences and offered expertise in beginning the dialog on the difficult and poorly understood topic of climate change. Past LEEC member Deepak Bhatnagar was recognized for seven years of service on the LEEC during the awards program. Our sponsor, Shell, and LEEC officers were also recognized.

ENVIRONMENTAL AWARENESS CONTEST

In the fall of 2017, LEEC announced its 16th Annual Environmental Awareness Student Art and Language Arts Contest. Open to public, private and home school students around the state from ages 5-18, the art and language arts contest invites applicants to submit paintings, drawings, poetry, fictional stories, and non-fiction accounts based on an environmental theme chosen by the commission. The 2018 theme was Green STEM Careers. More than 400 students submitted entries. First, second and third place winners received cash prizes in the amounts of $200, $100 and $75, respectively, and Lt. Governor Nungesser presented the awards at an awards reception held at Louisiana's Old State Capitol in June 2018. Each entry that placed in the prior year was included in the 2019 Louisiana Environmental Education Calendar, published in October 2018. These calendars are distributed throughout the state.

Staff assisted in hosting Anheuser-Busch volunteer event to build 350 picnic tables for New Orleans area parks and schools

OUTREACH

EXHIBITS AND PRESENTATIONS

Environmental Education staff exhibit at various events to disseminate environmental education information and current programming. Exhibit venues in FY 2017-2018 included:

- National Science Teachers Association Regional Conference in New Orleans
- Keep Louisiana Beautiful Conference
- Leaders Against Litter
- Louisiana Department of Education's Teacher Leader Summit
- Ocean Commotion
- Louisiana Earth Day
- Wetland Watchers
- Girl Scouts BIG Event
- Knock Knock Museum
- Louisiana Municipal Association Conference
- Louisiana Envirothon
- National Hunting and Fishing Day

ELECTRONIC DISSEMINATION

The Environmental Education Section published approximately 40 electronic newsletters and bulletins to the LDWF website in FY 2017-2018. The newsletter promotes Louisiana Environmental Education programs and environmental news, professional development opportunities, grants and student competitions. The newsletters were distributed to approximately 1,500 formal, non-formal and informal environmental educators from Louisiana and surrounding states.

SCIENCE PHENOMENA WEBSITE

A database of environmental science phenomena is maintained through a partnership with the Louisiana Department of Education and LSU's Gordon A. Cain Center for STEM Literacy. This database provides educators with the resources necessary to implement pedagogical practices associated with the Louisiana Student Standards for Science. The address is *www.louisianaphenomena.org*.

WEBPAGE

A current, informative webpage benefitting educators and the general public is maintained on the LDWF website. Applicable educational resource links, grants information and current programs are highlighted. The website is updated regularly to provide up-to-date information on programs, events and resources. The address is *www.wlf.la.gov/eec*.

KEEP LOUISIANA BEAUTIFUL

LDWF Environmental Education Section staff oversees a cooperative endeavor with Keep Louisiana Beautiful. Keep Louisiana Beautiful is led by a 12-member board of directors, a seven-member advisory board and three full-time staff members. Through programs and a statewide network of 39 Keep America Beautiful affiliates, Keep Louisiana Beautiful provides tools and resources to prevent litter, reduce waste, increase recycling and protect the natural beauty of Louisiana communities. The annual report on Keep Louisiana Beautiful programming will be submitted directly through Keep Louisiana Beautiful.

HABITAT

The objectives of the Habitat Section are to gather and compile data on fish and wildlife resources, determine the requirements for conserving the resources, and provide information to governmental agencies, nongovernmental organizations and the public. Data are also gathered on the potential impacts of human activities on the resources. These data and technical assistance are provided to regulators, planners and decision-makers in advance of execution of projects in order to avoid, minimize and/or mitigate any adverse environmental impacts. The Habitat Section is comprised of the four following programs: Statewide Environmental Investigations, Louisiana Natural and Scenic Rivers Program, Permits Coordination, and Seismic Section. In addition to our four established programs, at the beginning of the 2018 calendar year, the Habitat Section became heavily involved in the development of the state's new, multi-agency Watershed Initiative Program that was established by Governor Edwards' Executive Order JBE 2018-16 for Watershed-Based Floodplain Management Coordination.

STATEWIDE ENVIRONMENTAL INVESTIGATIONS

PERMIT REVIEW AND COMMENT - LDNR & USACE

Statewide Environmental Investigations is authorized under the Fish and Wildlife Coordination Act and is partially funded by a USFWS grant. Staff is responsible for reviewing and providing comments and mitigation recommendations on all permits sought from state and federal environmental regulatory agencies, primarily LDNR and the USACE. Staff members reviewed and provided comments to 1,219 state and federal permit applications during FY 2017-2018. It was determined that compensatory mitigation was required on approximately 28 percent of the 1,219 projects reviewed. Written comments and recommendations aimed at avoiding, minimizing and/or mitigating adverse impacts were issued by LDWF for all state and federal permit applications received.

Staff continued to receive a number of USACE Section 10 permit applications for the withdrawal of surface water classified as waters of the United States. These water withdrawal requests were primarily for hydraulic fracturing of shale formations. LDWF responded to all such permit requests with recommendations on how to conduct these substantial water withdrawals while also avoiding adverse impacts to fish and wildlife resources. A total of 12 such permits were issued during FY 2017-2018.

In addition to permit review, staff participated in permit site inspections and habitat evaluations, provided technical assistance to the public on wetland issues, and worked with private developers and consultants involved in the regulatory process. During FY 2017-2018, staff conducted several on-site field inspections and participated in 16 meetings and conference calls with applicants, agents and regulatory agency personnel. Staff gave presentations to non-governmental organizations, state agencies and user groups and attended several multiday technical workshops aimed at providing regulators a deeper understanding of stream restoration and mitigation.

Staff members also represented the agency on two Mitigation Bank Interagency Review Teams chaired separately by the USACE Vicksburg and New Orleans districts. The purpose of the Interagency Review Teams is to provide regulatory review, approval and oversight of wetlands mitigation banks. During FY 2017-2018, staff evaluated, inspected and provided technical comments and recommendations on dozens of wetlands mitigation banking proposals, mitigation banking instruments and mitigation banking monitoring plans. Two wetland mitigation banks were approved and authorized in Louisiana during FY 2017-2018, totaling approximately 325 acres statewide. Staff attended all Interagency Review Team meetings and nearly all of the site investigations. Staff worked with USACE to update multiple Mitigation Bank Templates.

Staff continued to provide technical assistance to USACE related to several large- and small-scale maintenance dredging projects, beneficial use projects, flood control projects, and navigation projects being undertaken by the New Orleans, Galveston, Fort Worth and Vicksburg districts.

Statewide Environmental Investigations also assisted in protecting all lessees of private oyster grounds by reviewing and approving, sometimes with modification, water bottom assessments submitted by project applicants prior to the initiation of activities affecting state water bottoms under lease to private parties for oyster production. Coastal Use Permit applicants can be required at the request of Statewide Environmental Investigations staff to modify the activity if the proposed project unnecessarily impacts oyster resources. There were 23 water bottom assessments reviewed and approved by agency staff during FY 2017-2018.

PROJECTS OF OTHER AGENCIES AND THE PRIVATE SECTOR

LDWF worked with numerous governmental agencies in conducting environmental investigations including:

- USFWS
- NMFS
- U.S. Environmental Protection Agency
- USACE
- USFS
- USDA
- Federal Highway Administration
- Federal Aviation Administration
- U.S. Coast Guard
- Department of Energy
- Federal Energy Regulatory Commission
- Department of Defense
- National Park Service
- Louisiana Department of Transportation and Development
- LDNR
- Louisiana Department of Environmental Quality
- Louisiana Department of Culture, Recreation and Tourism
- Louisiana National Guard
- Louisiana Division of Administration - Office of Community Development.

On a local level, we worked with several parish governments and local authorities providing technical assistance to them in relation to preservation of riparian habitat and other wetlands, flood control and other drainage projects.

TECHNICAL ASSISTANCE PROVIDED

Staff continue to track the number of telephone and e-mail responses provided to any request of a technical nature from the public, landowners, media, public agencies, universities, schools and non-governmental organi-

zations for conservation recommendations, guidance, biological data or project reviews. During FY 2017-2018 we replied to a total of 1,447 requests for technical information.

LOUISIANA NATURAL AND SCENIC RIVERS PROGRAM

The Scenic Rivers Program is charged with the administration of the Louisiana Natural and Scenic Rivers Act. The act requires that LDWF, through the Scenic Rivers Coordinator, administer a permitting system for activities that have potential for significant ecological impact to designated Natural and Scenic Rivers, as well as a system of monitoring, surveillance, investigation and enforcement for the purpose of ensuring compliance with the act. The Scenic Rivers Act, and the rules and regulations promulgated under its authority, provide for the development of management plans, stream surveys and enforcement. There are currently approximately 80 streams and/or stream segments in the system constituting an estimated 3,100 linear miles of Louisiana's streams, rivers and bayous.

The Scenic Rivers Program's website continued to be updated throughout FY 2017-2018. Applications for proposed activities on Scenic Rivers were made available online for review and comment by all interested parties. The interactive map which allows users to see where activities have been permitted in the past along with information about the applicant and nature of the activity was regularly updated by staff.

Staff has completed work on the State Wildlife Grants project which funded the development of several Scenic Rivers Management Plans.

Each Scenic River Management Plan accomplished the following:

- Identified important features to be protected and preserved.
- Identified potential issues, problems and needs that impact the river.
- Recommend measures for enhancement and reclamation of resources.
- Set forth management goals for the preservation of the river.
- Provided for continuing public involvement.

Several enforcement actions were initiated in FY 2017-2018. These included issuance of several Compliance Orders and the forwarding of 12 violations to LDWF's Enforcement Division for citations. The coordinator and staff, through routine surveillance, project inspections and response to complaints, ensured compliance with permit conditions, utilization of adequate sediment control measures, and appropriate cleanup and restoration of permitted project sites. Staff continued to spend a considerable amount of time and effort on numerous sand and gravel operations to develop/implement water management plans aimed at minimizing impacts to Scenic Rivers. Scenic River's staff also coordinated more closely with the Louisiana Department of Environmental Quality, to address some of the construction site stormwater and sanitary issues impacting several system streams. We initiated joint site inspections with Louisiana Department of Environmental Quality Water Quality staff, bringing their expertise to bear.

TOP LEFT: *View of scenic Bayou Chinchuba and its floodplain swamp taken by staff during FY 2017-2018.* ***BOTTOM LEFT:*** *Annotated photo of a scenic river violation which staff discovered during FY 2017-2018. The bank of the Comite River was altered by an unauthorized mining operation to allow for the collection of sand which was subsequently stockpiled on site and sold. Staff worked diligently to ensure that the activity ceased, and then began working toward restoration.*

Staff made 146 site investigations and surveyed over 332 miles of streams. During surveys, Scenic River staff noted potential violations and continued efforts to document derelict vessels, attempted to locate responsible parties and have the vessels removed by whichever means prudent.

The coordinator and staff maintained regular contact with both state and federal agencies to ensure that designated scenic rivers were considered in all levels of planning and permitting. They also worked closely with city planners, police juries, mayors and local interest groups and organizations throughout the state. We coordinated with Louisiana Department of Transportation and Development to have Scenic River signage installed at numerous crossings along system streams.

A total of 30 Scenic River Permits were issued during FY 2017-2018. In addition to considering permits, Scenic Rivers staff made 44 determinations of "no permit required" for activities undertaken near scenic rivers but with no potential to significantly degrade the ecological integrity of a scenic river. Staff held 40 meetings and conference calls with applicants and agents, specific to scenic rivers issues.

PERMITS COORDINATION

The purpose of the Permits Coordination Program is to ensure that LDWF receives, reviews and responds to and distributes comments and mitigation recommendations on all permit notices received from state and federal environmental regulatory agencies in an efficient and timely manner (i.e. prior to public notice comment period deadlines). LDWF's written comments are in-turn used by the regulatory agencies to make final determinations on how to best avoid, minimize and/or mitigate adverse impacts to fish and wildlife resources.

In order to accomplish this task, the LDWF permits coordinator serves as the primary liaison and "single point of contact" for all regulatory agencies, primarily LDNR and USACE. It is the responsibility of the permits coordinator to ensure that the LDWF biologist with the appropriate authority and expertise is included in the formulation of written comments and mitigation recommendations. The permits coordinator also ensures that there is adequate department representation at all LDNR Geologic Review and pre-application meetings.

The permits coordinator also utilizes, maintains and populates a comprehensive searchable database for all permit notices. This database is of critical importance to ensure a timely response from LDWF. The database also archives LDWF's formal response to all permit notices dating back to 2006.

During FY 2017-2018, the permits coordinator received, processed, tracked and disseminated 1,219 permit notices.

SEISMIC SECTION

The LDWF Seismic Section was created in 1939 specifically to protect fish, oysters, shrimp, wildlife and other areas of concern from the effects of seismic exploration. Seismic exploration uses energy waves to generate a profile of sub-surface reflective layers that help define potential oil and gas traps. The energy waves can be produced by explosives detonated below the ground, by air guns that emit a burst of air at the surface of water bodies, by large vibrating pads placed on the surface, or other energy sources. These projects can occur in sensitive wetlands, water bodies and other habitats.

LDWF performs a Natural Heritage Review on each individual seismic job to determine the presence of rare, threatened and endangered species and other areas of conservation concern. The Natural Heritage Review includes specific conditions that the applicant must adhere to for the protection of such resources. LDWF Seismic agents also monitor geophysical companies to protect Louisiana's fish and wildlife resources by ensuring compliance with LDWF seismic rules and regulations.

Some of the Seismic Sections accomplishments for FY 2017-2018 are:

- Monitored six seismic projects throughout the state.
- Two public meetings were conducted to inform landowners and user groups of seismic surveys beginning in there area.
- Four meetings with seismic survey companies were held to better minimize impacts to fish and wildlife resources.
- 39 days were expended on field monitoring.
- Closely interacted with seismic companies to ensure compliance with the rules and regulations of the Seismic Section.
- Ensured protection of threatened and endangered species and other areas of concern.

WATERSHED INITIATIVE

In March and August 2016, Louisiana experienced two historic rain events that produced trillions of gallons of rainwater and impacted 56 of Louisiana's 64 parishes. Widespread flooding exposed weaknesses in Louisiana's approach to floodplain management and planning. Water does not recognize political or arbitrary boundaries; thus, it must be managed, and associated risks mitigated, in a manner that takes this behavior into account (Watershed Vision Whitepaper, 2018). In response, following the Governors May 2018 Executive Order (EO JBE18-16), various state agencies, including LDWF began collaborating on a framework to advance a watershed based approach to floodplain management and flood risk reduction, the Watershed Initiative.

LDWF is committed to solving watershed management collaboratively with our partnering state agencies, as well as cities, parishes, federal agencies, research and nonprofit organizations, universities and private-sector participants. By highlighting and promoting the ecological services which our state's floodplains provide, we have ensured that conservation and restoration of our floodplains' natural functions are recognized as an essential strategy for flood risk reduction. We have also helped to ensure that modeling and science drive future watershed level decision making and that the consequences of management decisions and other actions are better understood and considered prior to project selection.

During FY 2017-2018, Habitat Section staff have worked as our agencies single point of contact and coordinator and have also taken on the roles of working group member and technical advisory group leader. In that time, Habitat staff attended three Watershed Council meetings, updating the council and providing information to our representatives. Our staff have also attended five Working Group meetings and conference calls, developing various aspects of the program for the council's consideration. In addition to these activities, staff have also represented both LDWF and the Watershed Initiative at nine related meetings and workshops.

MINERALS MANAGEMENT

One of two Rockefeller Refuge Marsh Mitigation Bank sites totaling approximately 169 acres of restored brackish marsh.

The Minerals Management Program, hereafter called Mineral Program, is responsible for ensuring that mineral activities on all LDWF properties are compatible with the environment and that such activities do not prevent LDWF from meeting WMA/refuge goals and objectives. In FY 2017-2018 Mineral Program staff reviewed, evaluated and authorized 60 well locations, pipeline projects and other mineral exploration related activities on LDWF properties. During FY 2017-2018, the program also issued 13 rights-of-way, surface leases and servitudes for oil and gas activities occurring on LDWF properties. All of these projects are reviewed and coordinated with field personnel to ensure that they are compatible with LDWF management area programs.

In FY 2017-2018 the Mineral Program continued to generate significant revenues for LDWF, which includes mineral royalties, rights-of-way, surface leases and seismic fees. The Mineral Program represented LDWF at each monthly meeting of the State Mineral and Energy Board. The Mineral Program also coordinated with the LDNR Office of Conservation for the removal of numerous abandoned oil and gas facilities on WMAs and refuges. The Mineral Program continues to work closely with other programs within LDWF and the LDNR Office of Coastal Management in an ongoing effort to streamline the Coastal Use Permitting process.

WETLAND MITIGATION BANKING

The Mineral Program continued to ensure regulatory compliance and coordinate credit sales for LDWF's two wetland mitigation banks located on Rockefeller Wildlife Refuge and Boeuf WMAs. These restored wetland ecosystems functionally compensate unavoidable impacts, such as those associated with oil and gas exploration and production, occurring within LDWF's WMA and refuge system.

DREDGE FILL PROGRAM

In addition to the above mentioned duties, the Mineral Program has continued to administer LDWF's Dredge Fill Program. This program issues approximately 75 licenses annually for the dredging and severing of state water bottoms. This program also collects approximately $1 million in annual severance royalties associated with dredging and severing state water bottoms. In FY 2017-2018 commercial dredge fill pits were inspected to ensure operator compliance with program regulations and LDWF also actively investigated unlicensed commercial pit operators (*Figure 1*).

One of two Rockefeller Refuge Marsh Mitigation Bank sites totaling approximately 169 acres of restored brackish marsh.

FIGURE 1. *Commercially licensed dredge fill pits in Louisiana.*

PERMIT ACQUISITION

The Mineral Program applied for and received three USACE permits and 16 LDNR Consistency Determinations which authorized LDWF to undertake management actions on LDWF properties statewide. All permit requests must also be coordinated with and approved by federal resource agencies (i.e., USFWS, Environmental Protection Agency and NOAA - NMFS).

WATER RESOURCES

LDWF continued to serve on the Louisiana Water Resources Commission. The purpose of the commission is to develop a statewide water management plan for ground water and surface water use and conservation. Much of the focus of this initial plan was on ground water resources. The commission convened twice during FY 2017-2018 to receive reports on progress of implementing the recommendations of the initial plan. Furthermore, a working group of the Water Resources Commission, which included LDWF, met twice to study the possibility, implications and mechanisms for out-of-state sale of publicly owned surface waters in Louisiana. As the commission continues its work, our role will be to ensure that the conservation of fish, wildlife and their supporting habitats as well as outdoor recreation are an important consideration when making water management decisions.

Office of Fisheries

MISSION

The purpose of the Fisheries program is to manage living aquatic resources and their habitat, to support the fishing industry, and to provide access, opportunity and understanding of the Louisiana aquatic resources to the state's citizens and other beneficiaries of these sustainable resources.

OBJECTIVES

- To provide high-quality fishery management information through effective data collection, analysis and information sharing.
- To be an effective, efficient steward of our renewable aquatic resources.
- To provide and enhance the recreational fishing experience through improved access, opportunity and public awareness.
- To maintain a sustainable and economically viable fisheries environment.
- To create a work environment in which all Fisheries staff are enabled and empowered to achieve the office's goals and objectives.

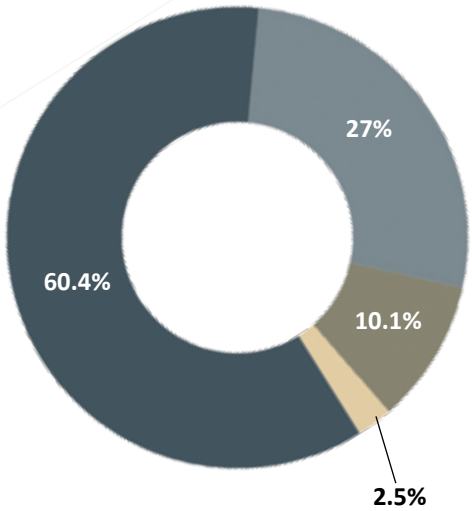
ORGANIZATION

The Office of Fisheries structure is comprised of the following sections and programs:

- ***Marine Fisheries*** - to manage the marine (saltwater) fisheries resources of the state.
- ***Inland Fisheries*** - to manage the inland (freshwater) fisheries resources of the state.
- ***Oyster Lease Program*** - to manage oyster lease agreements and alternative oyster culture permits.
- ***Fisheries Research and Assessment*** - to provide technical and scientific research in support of fisheries management.
- ***Fisheries Extension*** - to provide guidance and assistance to Louisiana's valuable commercial fishing industries, and to provide fishery management information to the recreational sector through improved fishing and boating access, aquatic outreach and volunteer activities.

FISHERIES FUNDING

FISHERIES FUNDING SOURCES
(APPROPRIATED FUNDING)



The Statutory Dedications utilized by the Office of Fisheries are primarily from the Conservation Fund and the Artificial Reef Trust Fund. The Conservation Fund is funded primarily by license revenue and oil and gas revenue from Louisiana Department of Wildlife and Fisheries (LDWF) property. The Conservation Fund is a general funding source used to fund invasive aquatic plant control, marine fisheries monitoring and research and general office operations. The Artificial Reef Trust Fund is funded through donations from oil and gas companies. Oil and gas companies donate one half of the realized savings over a traditional onshore removal of obsolete oil and gas offshore structures. The Artificial Reef Trust Fund is used to fund the building and monitoring of inshore, nearshore and offshore artificial reefs, and operations of the Artificial Reef Program.

Federal funds used by LDWF come from various federal entities, such as USFWS, NOAA and Gulf States Marine Fisheries Commission (GSMFC). Funds from USFWS are primarily from federal assistance in the Sport Fish Restoration Program. These funds are dedicated to marine and freshwater monitoring, research, management and boating access, aquatic education, and aquatic outreach. The funds from NOAA represent various grants that are utilized to collect offshore fisheries independent data and commercial fisheries dependent data. The funds from GSMFC represent various grants that are utilized to collect recreational and commercial fisheries dependent data.

Interagency transfer funds are provided by other state agencies and used to fund various projects. These projects include fisheries monitoring associated with freshwater diversions, oil spill response and damage assessment, and oil spill restoration projects.

Self-generated funds are provided by other non-governmental entities and are used to fund various projects. These projects include funding for marine mammal stranding response and mapping.

RESOURCE MANAGEMENT

Louisiana's fisheries resources benefit all constituent groups in Louisiana, across the Gulf Coast and throughout the nation. The Louisiana Constitution of 1974 provides the framework to protect and enhance habitat and to ensure sustainable commercial and recreational fisheries. Fisheries biologists collect the basic ecological data needed to efficiently and effectively manage fisheries resources to benefit all constituent groups.

LDWF is responsible for managing Louisiana's fisheries and maintaining healthy fish populations and habitat for the benefit of Louisiana's residents and visitors of both today and tomorrow. Responsible fisheries management starts with sound, scientific information about fish populations and the ecosystems in which they live, as well as the fisheries that harvest them. LDWF biologists use a variety of methods to gather this information, including examining fishermen's catch (fishery dependent data) and conducting scientific studies (fishery independent data).

Shrimp Sampling - 16-foot trawl deployment.

MONITORING

Monitoring fisheries, both fresh and saltwater, is a crucial component of resource management. Important biological data is collected specific to each type of sampling. In addition, hydrological data (conductivity, turbidity, dissolved oxygen, salinity and water temperature) are collected with each biological sample, as are air temperature and unusual or other significant conditions. The information gathered during monitoring efforts, such as fisheries independent sampling, gives biologists and administrators the information essential to manage each fishery appropriately; openings, closures, limits and emergency actions are based upon monitoring data.

SHRIMP SAMPLING

The long-term objectives of the shrimp fishery research program are to assess and monitor shrimp stocks and to evaluate shrimp fishery impacts on other fisheries and protected species. Each species requires an annual assessment of the condition of the stock, the fishery and sectors of the economy that are impacted by changes in either. The assessments are also needed so that LDWF can determine whether or not a stock is overfished.

Inshore and offshore shrimp sampling continued during FY 2017-2018. In inshore waters, 249 6-foot and 1,795 16-foot trawl samples were collected. In state offshore territorial waters and the Exclusive Economic Zone (EEZ), 309 20-foot trawl samples were collected. Information crucial to setting the opening dates of the 2018 spring inshore shrimp season, closure dates of the 2018 spring inshore shrimp season, opening and closing dates of the 2017 fall inshore shrimp season, and the closing and reopening of shrimping in portions of state territorial waters in 2017 and 2018 was collected using these sampling procedures.

OYSTER SAMPLING

Management of the public oyster grounds and reservations relies heavily upon data gathered through a comprehensive biological monitoring program. State biologists use two

***LEFT:** Cultch material deployment on Long Point Cultch Plant in Calcasieu Lake. **RIGHT:** Retrieval of oyster dredge sample.*

gear types (24-inch hand dredge and square-meter frame) when sampling the public reef areas, and analyze the data collected to determine overall health of the oyster resource. Over 500 square-meter samples are collected in early July (including 25 sites in Barataria Basin for the CPRA System-Wide Assessment and Monitoring Program, and approximately 2,400 dredge samples are collected during each calendar year (including three sites sampled each event for the CPRA System-Wide Assessment and Monitoring Program). In addition, 34 square-meter sites in Barataria Basin and 48 square-meter sites in Pontchartrain Basin are each sampled in April/May and again in September/October for the CPRA System-Wide Assessment and Monitoring Program. Following the opening of the Bonnet Carré Spillway in March 2018, 40 additional dredge samples were collected in the Pontchartrain Basin during March and April 2018, to monitor for mortality events from freshwater influx.

Square-meter data is used to measure the annual oyster stock size and for yearly oyster season recommendations by the Office of Fisheries. Dredge data is used to monitor the overall health of the oyster resource during the year and to assess recruitment of new age classes of oysters into the population. Field biologists also gather hydrological data on public oyster areas and develop harvest and fishing effort estimates by conducting boarding report surveys of oyster boats. Reef areas are determined using periodic side-scan sonar surveys, historical reef maps and poling surveys. In addition, Sustainable Oyster Shellstock models, also called Shell Budget models, are being developed and utilized to provide harvest thresholds that will maintain reef material.

Annual Oyster Stock Survey

The statewide oyster stock size in 2017 decreased from 2016 levels, approximately 899,799 barrels of oysters decreased to 614,097 barrels available on the public oyster areas of Louisiana (including Sabine Lake in the averages). Unfortunately, this stock size represents an approximate decrease of 31.8 percent from 2016 levels and 81.2 percent decrease from the long-term average of 3.26 million barrels.

Sustainable Oyster Shellstock Modeling

Under contract and through collaboration with LDWF, a research team led by Dr. Tom Soniat at UNO continued working with LDWF to test a sustainable oyster shellstock model for the public oyster areas of Louisiana. This computerized model provides guidance for fisheries management with the goal of conserving the oyster reef base. Oyster stock assessment sampling in 2017 provided model input data such as estimates of reef mass (grams per square-meter) and size-frequency of oysters. Utilizing additional data on oyster growth, mortality and estimated commercial harvest rates, the model estimates the amount of oyster harvest that can be allowed while preserving the reef mass. The model was tested statewide and showed promising results. It continues to be tested and strengthened utilizing updated data each year.

Cultch Planting

Two cultch projects were completed in FY 2017-2018, including a new 100-acre limestone cultch plant in Calcasieu Lake near Long Point, and the placement of oyster shell cultch material onto the Lake Fortuna Public Oyster Seed Ground, atop the 2012 Lake Fortuna cultch plant. Recently acquired side-scan sonar equipment allowed mapping of reef areas pre- and post-planting and will be used each season (pre- and post-harvest) to improve monitoring and subsequent management of these investments.

In Calcasieu Lake, 13,413 cubic yards of limestone were deployed, and the project was completed Dec. 17, 2017. Funding for this cultch plant came from the Public Oyster Seed Ground Development/Conservation Accounts.

In Lake Fortuna, LDWF worked with St. Bernard Parish Government to place additional cultch material onto 100 acres of the existing 2012 Lake Fortuna cultch plant (2012 early restoration cultch plant), in order to increase reef height, minimizing the chances of sedimentation and hypoxia-induced mortality. In April 2018, 16,000 cubic yards of dry oyster shell were deposited. Funding for this project came from NRDA early restoration oyster funds.

Michael C. Voisin Oyster Hatchery Operation Overview

The Michael C. Voisin Oyster Hatchery is operated cooperative by both LDWF and Louisiana Sea Grant. Louisiana Sea Grant is contracted to assist with facility operations and to provide recommendations to LDWF for hatchery operations. Hatchery staff work together to produce oyster larvae and algae. Phycologists grow marine microalgae, which is used to feed oyster larvae and supplement broodstock holding systems. LDWF staff includes a biologist supervisor and two biologists. One biologist is designated as a Senior Phycologist and Water Quality Manager and the other biologist is designated as a Water Systems and Larval Production Assistant Manager. Louisiana Sea Grant staff includes three research associates. Like LDWF, one research associate is a phycologist, another manages the water systems and larval production, and one manages the Louisiana Sea Grant Oyster Research and Demonstration Farm, as well as the Louisiana Sea Grant Breeding Program.

Historically LDWF focused to produce diploid larvae and spat for restoration, but that mission changed in 2018 when LDWF was tasked with handling larval and seed sales. Sales had been a Louisiana Sea Grant task since the hatchery opened in 2015. Furthermore, in the spring of 2018 LDWF was most concerned with producing triploid and diploid pediveliger larvae and seed to fulfill customer/industry orders and in the fall of 2018 producing diploid pediveligers for restoration projects. Louisiana Sea Grant hatchery staff also conduct research and provide extension services for people interested in topics such as growing oysters, producing larvae and operating seed nursery systems. LDWF and Louisiana Sea Grant staff work together to produce diploid, triploid and tetraploid larvae and seed for orders, restoration, breeding program and research.

Louisiana Sea Grant manages a diploid and tetraploid oyster breeding program housing several breeding lines of diploid and tetraploid oysters. Diploid and tetraploid refers to the number of chromosome sets an organism contains (diploid being two sets and tetraploid four sets). Tetraploid oyster sperm is used to fertilize diploid oyster eggs, which reliably produces 100 percent triploid (three chromosome sets) oysters. LSU and a private breeding company, 4Cs Breeding Technologies, Inc., share intellectual property rights for these tetraploids. 4Cs licenses the use of these tetraploid oysters.

Ploidy state of oysters is determined by flow cytometry, which is a technique that measures physical or chemical properties of particles by illuminating the particles. For oysters, cells are stained with a DNA-specific fluorescent stain and illuminated with a UV light source. The relative luminous emittance of the particles informs the analyst of the ploidy state of the cell passing through the light source. For example, a tetraploid cell contains twice as much DNA material as a diploid cell, thus when stained and illuminated that cell emits twice as much light as a diploid cell. In 2018, Louisiana Sea Grant staff trained the LDWF biologist supervisor on how to use the flow cytometer and verify tetraploid sperm, triploid larvae and triploid seed.

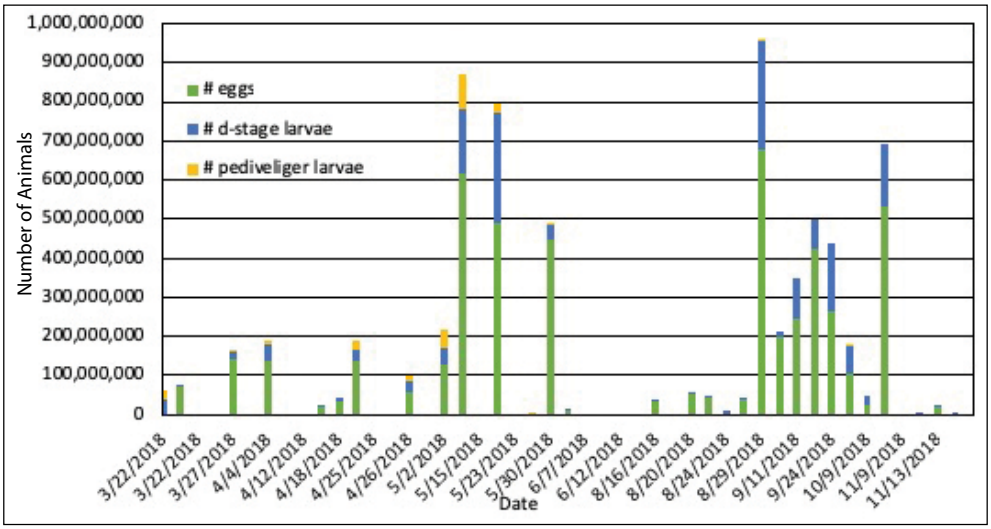


FIGURE 1. *Number of animals (eggs and larvae) produced by LDWF during 2018 hatchery season. Includes both diploid and triploid larval production for sales and restoration. Dates indicate spawn attempts, dates with bars were successful, dates with no bars were terminated (generally due to lack of male tetraploids or female diploids spawning or no broodstock spawning). There were more pediveliger larvae (shown in yellow) produced in the spring rather than in the fall. The majority of larval production in the spring was triploid larvae. The majority of fall production was diploid larvae. Both mid-spring and early fall had successful spawns with large numbers of eggs (shown in green).*

The hatchery had additional help throughout the spring, summer and fall from Fisheries Research Lab staff, Nicholls State University graduate interns and volunteers. Helpers assisted with dropping larval hatching tanks, cleaning tanks, collecting daily water quality, cleaning algal glassware, spawning oysters, culling adult oysters, power-washing longline bags, and rinsing the up-welling nursery system. In the fall, hatchery staff had help making shell bags in preparation for fall diploid production. Fall help included staff from the LDWF Fisheries Research Lab, LDWF New Orleans and Bourg offices and LDWF's Outreach Volunteer Instructor Program.

Larval Production

The 2018 hatchery larval season began on March 19, when hatchery staff began spawning attempts. A successful spawn on March 19 was the earliest spawn conducted at the Michael C. Voisin Oyster Hatchery. Spawning mid-March was made possible due to successful conditioning of broodstock oysters in a warm broodstock holding system for about three weeks. Conditioning oysters in the spring allows the hatchery to ripen broodstock oysters before wild oysters left in the bay ripen. In addition, conditioning broodstock is a hatchery technology that can expand larval production into cooler months. A boiler system also allows the hatchery to expand the larval season. The boiler heats filtered seawater to maintain an optimal temperature (around 28°C) for raising oyster larvae during cooler months. After March 19, spawn attempts continued weekly until the end of June, when broodstock were no longer in spawning condition (*Figure 1*). Spawning resumed mid-August when broodstock were ripe again.

Grand Isle - Fisheries Research Lab shell bagging event: in order to fill shell bags with recycled oyster shell for a potential spat-on-shell pilot study, lab biologists teamed up with staff from other offices and several volunteers, successfully completing over 2,000 shell bags with just two such events.

The LDWF goals for the spring and fall larval production were slightly different. The focus for spring was to produce triploid pediveligers to fulfill customer orders. The focus for fall was to produce diploid pediveligers for setting on whole oyster shell and deploying hatchery-produced spat-on-shell on restoration test plots designated by the LDWF oyster program manager.

Spring Production

Highlights from the spring production include approximately 97 million triploid pediveliger larvae sold to customers; the majority of which were sold to Louisiana oyster growers. Also, approximately 259,667 triploid seed and 354,000 diploid seed were sold to customers. Spring production also produced a surplus amount of larvae, which were used for restoration projects that are managed by The Nature Conservancy and Coalition to Restore Coastal Louisiana.

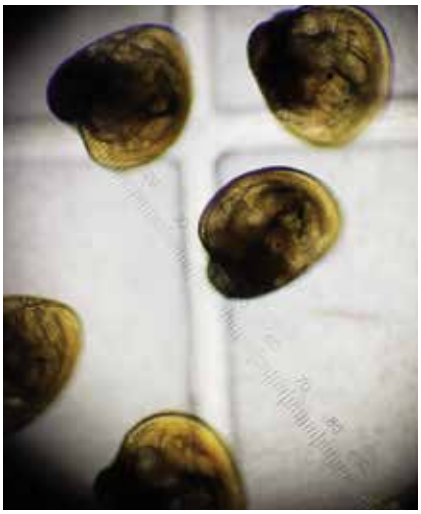
Surplus Larva and Seed

There were periods during the spring 2018 season when there was a surplus of diploid or triploid pediveligers and/or seed. Surplus pediveligers and seed occurred when the industry was no longer able to accept hatchery product. LDWF contacted customers who placed orders through the LDWF online order form additional times to ensure customers were unable to receive products. LDWF set the extra pediveligers onto macrocultch (ground up pieces of oyster shell) to produce spat-on-macrocultch for restoration purposes.

In June CSA1 deployed the spring spat-on-macrocultch, as well as surplus seed along The Nature Conservancy's living shoreline site near Lake Fortuna. Nine 5-gallon buckets and several bags of hatchery product were distributed along approximately 650 meters

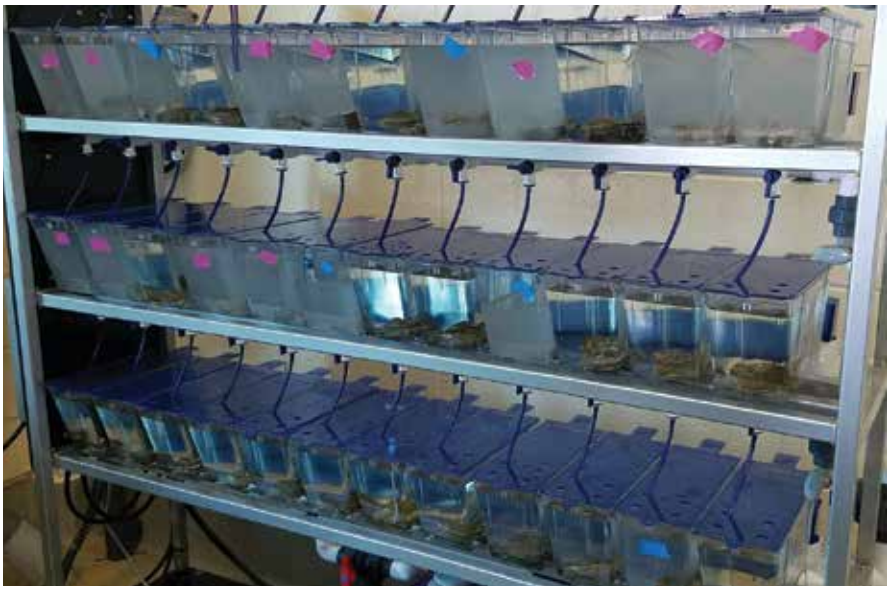
of shoreline stabilization structure. There was also an additional deployment of surplus seed (seed sizes 3-69 millimeters) and spat-on-macrocultch in August. The August deployment locations included sections within The Nature Conservatory Oyster Break restoration site and the Coalition to Restore Coastal Louisiana Gabion Shell Reef restoration site. Approximate numbers of diploid and triploid products deployed were 56,775 diploid spat-on-macrocultch, 128,059 triploid spat-on-macrocultch, 602,545 diploid seed, 3,371 diploid or triploid seed (seed caught on nursery overflow screen) and 530,498 triploid seed.

In addition to setting surplus larvae on macrocultch, extra triploid pediveligers were set on whole oyster shell. Shell was contained in shellbags and placed in raceway tanks under the Fisheries Research Lab. These shellbags were extra bags leftover from a 2014 hatchery-produced spat-on-shell pilot project. Approximately 63,570,745 triploid pediveligers were set on 23 shell bags (approximately 2,714 shells). Furthermore, at the end of May 2018 approximately 3,799 triploid spat were deployed in the bay near the end of the Louisiana Sea Grant pier. Shell was sampled about two months after deployment. The two-month samples had a greater number of estimated dead spat than was originally deployed. This may be due to a low sample size that was used to initially estimate the number deployed, unevenness of setting in the setting tanks, initial samples collected happen to have a poor set, or a wild set occurred during the two months. The estimated number of live animals that survived at two months was 3,528 spat.



Eyed triploid larvae produced at the Michael C. Voisin Oyster Hatchery.

Surplus larvae were also set on finely ground aragonite microcultch (the same material that is used in aquarium tanks), to test if aragonite is a viable cultch material for producing single seed oysters. We set small numbers of pediveliger larvae from two different broods on two separate occasions during the spring. The percent success from pediveliger to seed was 1 percent. The industry standard for percent setting rate is about 20-25 percent, which is the ratio of oysters that successfully metamorphose from larvae to spat (personnel communication Dr. Brian Callam). The 1 percent was determined after the seed were greater than 14 millimeters (3n_04/04/18 brood) and 5 mm (3n_05/30/18 brood). The number of seed oysters that resulted from these sets were 10,988 and 161 per brood. Based on these two aragonite setting trials, aragonite microcultch can be used to produce seed oysters; however, the number of seed produced is expected to be less than 1 percent of the number of pediveligers used for setting.



Triploid spawn using spawning rack at Michael C. Voisin Oyster Hatchery. Spawn resulted in 618M eggs (May 8, 2018).

Algal Production

In addition to raising oyster larvae, the hatchery also produces live marine microalgae to feed oyster larvae and provide supplemental feed for broodstock held in conditioning/holding systems.

The 2018 algal season began in January to produce supplemental feed for conditioning brood stock and feeding larvae. The algae that is grown is maintained in the Stock Room and Algal Production Room. In the Stock Room we house flasks ranging from 500 mL to 2L so that we can slowly increase the volume of our stock cultures before moving them to the Algal Production Room and into an algal bag. The Algal Production Room has 144 hanging algal bags, that can produce approximately 2,000 L of algae feed per day. Hatchery staff work on maintaining optimal and consistent pH, salinity and temperature for the algal cultures

This year was the first attempt to continue all of the stocks from the prior year and not request new stocks from NOAA in Milford, Connecticut. The 2017 stocks were grown all the way back up into bags; however once in the bags growth was severely slow. Bags were taking nearly three weeks to harvesting height and pushing the flow in the room past 5mL/min would cause bags to start crashing. Ideally bags would be at harvesting height in less than two weeks, and in order to produce enough algae to feed our flow through tanks the flow needs to be at least 8mL/min. It was decided to proceed by ordering new stocks from NOAA; since then the bag system returned to a healthy and thriving algal environment.

A couple improvements were made to the Algal Production Room for enhancing the quality of algae produced. Improvements included the addition of adjustable window shades and a ceiling fan on the north wall of the Algal Production Room to maintain cooler and constant temperatures during the hot summer months. Based on our daily temperature data collection, the temperature in the Algal Production Room during July and August 2018 is more constant than in the past three years. High quality algae is important for growing healthy oyster larvae.

In the 2017, season bags lived on average only 19 days once in the Algal Production Room, with the longest living bag surviving 106 days. This year the longest living bag survived almost twice as long at 190 days and we expect that the average bag life was closer to two months (data entry pending). In addition, the reason many of the bags that were taken down in FY 2017-2018 was due to the space needed for new Fernbach flasks to be inoculated and not due to poor bag quality. Even when there were problems with bacteria in the fall, the algae appeared healthy with the flagellate species remaining dark and dense and the diatoms living for approximately a month before crashing.

Overall, the improvements made to the Algal Production Room in FY 2017-2018 especially those made to maintain constant temperature in the Algal Production Room, played an important role in the success of the algae production this season. Future improvements are being made to promote the overall health of the algae; therefore, the health of the oyster larvae as well.

Sales

LDWF began managing larval and seed sales Jan. 1, 2018. The purpose of selling seed, for a minimal cost, and larvae is to support and enhance the industry. LDWF launched an online order form for hatchery-produced larvae and seed in February 2018 (*www.wlf.la.gov/fishing/oyster-larvae-order-form*). LDWF's Commercial Outreach Section manages the order form, contacting customers and coordinating production needs with the hatchery biologist supervisor and Fisheries Research Lab director. In 2018, LDWF accepted both in-state and out-of-state orders. Customers have the option of purchasing diploid or triploid hatchery seed or pediveliger larvae. The majority of orders received were for triploid pediveligers. By July 2018, all spring sales were complete.

Remote Setting Program

Since the 2010 *Deepwater Horizon* oil spill, Louisiana's public oyster seed grounds have experienced significantly lower levels of successful oyster reproduction (oyster spat set). Spat set is a key indicator of the overall oyster population's stability because it shows the recruitment of young oysters into the population. In response, LDWF developed the Remote Setting Program to increase oyster production levels.

LDWF is working closely with Plaquemines Parish on the Remote Setting Program and is utilizing Buras Boat Harbor as the program's work site. The Oyster Remote Setting Facility became operational in November 2017. Using the last available larvae of the Grand Isle hatchery season, a limited trial run was conducted using one-half of one of the three tanks in Buras. Four cages (approximately 4 cubic yards) of washed shell were placed in tanks, soaked, and set with approximately 4 million frozen/thawed spat. The trial run proved successful, with an estimated 8.4 spat/shell calculated. The spat on shell were transported to and deployed in Lake Fortuna (Lake Machias) in late 2017. The status of future operations has yet to be determined, and no further tests have been conducted in Buras.

LDWF is also collaborating with the Coalition to Restore Coastal Louisiana to collect and stockpile oyster shell at the Buras site. Oyster shell is the material of choice for setting larval oysters. This program began during FY 2013-2014, when the Coalition to Restore Coastal Louisiana began delivering shell to the Buras site for storage. As of June 2018, approximately 3,194 tons of shell had been delivered to the site.

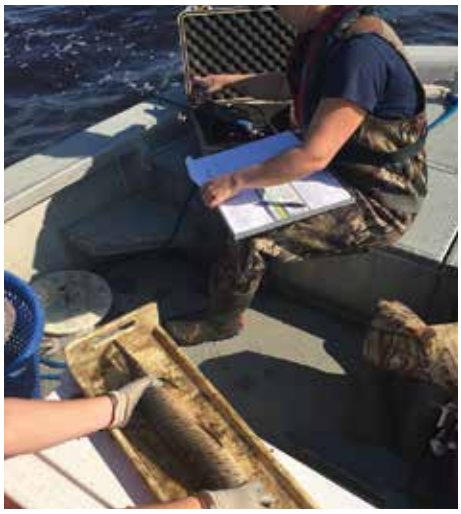
MARINE FINFISH SAMPLING

The primary objective of the Finfish Program is to make rational recommendations for the management of coastal finfish stocks based on a database of scientific information. The information in the database is collected through fishery independent and dependent sampling. The fishery independent monitoring program is an ongoing collection of data by fisheries biologists in the field conducting surveys designed to sample coastal waters in an objective manner. The surveys collect information based on geographic ranges independent of commercial or recreational fishing operations.

Three gear types are used coast-wide to sample various year classes of estuarine-dependent fish:

1. A bag seine is used to sample young-of-the-year and provide information on growth and movement. More significantly, these samples provide information on the forage species and ecological components of marsh-edge and shoreline habitats throughout the coastal zone. Seine samples are taken monthly.
2. A gill net is used to sample juvenile, sub-adult and adult fish. It provides information on relative abundance, year class strength, movement and gonad condition. Gill net samples have been collected semi-monthly from April through September, and monthly from October through March using a strike net technique.

Marine Finfish Sampling LEFT: *Seine retrieval.* ***RIGHT:*** *Seine sample.*

Marine Finfish Sampling LEFT: *Gill net retrieval.* ***RIGHT:*** *Processing of gill net sample and collection of water quality data.*

3. A trammel net is used to sample juvenile and sub-adult fish. It provides information on relative abundance, standing crop and movement. Trammel net samples are taken monthly from October through March.

During FY 2017-2018, the fishery-independent finfish sampling program collected 933 of 933 (100 percent) gill net samples, 1,234 of 1,224 (101 percent) seine samples, and 269 of 270 (99 percent) trammel net samples for a 100 percent overall completion rate statewide.

Marine fisheries biologists also collected 124 electrofishing samples in the Barataria Basin as part of an Interagency Agreement for coast-wide sampling as well as a State Wildlife Grant evaluating populations of certain estuarine species of concern.

FRESHWATER FINFISH SAMPLING AND MANAGEMENT

Waterbodies throughout Louisiana differ in their importance to the overall state fisheries and in the degree to which they can be managed. LDWF routinely samples a subset of rivers, streams, lakes and reservoirs based on their importance to the fishing public, size, productivity, and in the case of reservoirs, drawdown capability. Other considerations include existing and potential management needs that are specific to the waterbody. Waterbody sampling schedules are developed each year and monitoring and management results are reported in LDWF Waterbody Management Plan updates, which can be accessed on the LDWF website.

Freshwater fisheries resources are monitored and managed through various sampling methods. In FY 2017-2018, biologists estimated relative abundance, age, growth and mortality, size class structure, species composition and genetic composition of sportfish populations in addition to physiochemical characteristics of the water on 110 lakes, rivers and streams. Sampling sites on inland lakes, reservoirs and rivers are predetermined and selected to represent available aquatic habitats within the various water bodies. Sampling protocol is standardized to the extent possible to allow for comparison of data over time and includes electrofishing, lead net, seine net, hoop net and gill net gear types. Lotic sampling methodology follows lake methodology closely, with the addition of habitat type and river stage parameters. LDWF Inland biologists have developed standard operating procedures for sampling rivers and wadeable streams for biomonitoring of fish and mussel communities. Three river systems (Calcasieu, Sabine and Tchefuncte) were surveyed for mussel populations during FY 2017-2018.

Electrofishing samples are collected in both spring and fall to provide an estimation of population trends including abundance, size, distribution, age structure and genetic composition. Sampling includes largemouth bass and crappie in the spring and fall for species population assessments, and fish community assemblage samples of all species collected in the fall of each year. A total of 671 stations were sampled for 141 hours of timed electrofishing during FY 2017-2018.

Seine samples are taken in many water bodies to determine fish community relative abundance and young-of-the-year recruitment of popular sport fishes that might be underrepresented with electrofishing gear. These samples occur from June to August each year. Thirty-three seine hauls were made during the FY 2017-2018.

Entanglement and trap net webbing are also used during standardized sampling throughout the year to collect crappie species, catfishes and sunfishes. A total of 308 gill net samples were taken on various lakes and rivers, while 204 lead net and hoop net samples were fished during FY 2017-2018.

With increased public demand for evaluation of freshwater fish harvest regulations, detailed largemouth bass age and growth assessment studies started or continued on 14 water bodies during FY 2017-2018, while crappie population assessment studies started or continued on four lakes. The extensive age, growth and mortality data collected for these assessments are used to inform and evaluate future management decisions and are summarized in LDWF technical report series.

Water quality data is collected each time a fisheries sample is collected on a waterbody. In FY 2017-2018, approximately 242 water quality stations were sampled for physical and chemical criteria including temperature, dissolved oxygen, pH, salinity and conductivity. In addition, at least one waterbody in each of nine districts is sampled monthly for one year in order to develop stratification profiles to determine thermocline formation and vertical changes in water quality throughout the water column.

Revisions were made to regulations for largemouth bass on Caney Creek Reservoir and include the following:

- Removal of the 15-19 inch protective slot limit and eight fish creel (two fish over the slot) for largemouth bass
- Established statewide regulation (no minimum length limit, 10 fish creel) for largemouth bass

Stocking data for LDWF waterbodies can be found in the Freshwater Fish Hatchery Program section of this report.

RIVER AND STREAM SAMPLING

Standard operating procedures for conducting biomonitoring of fish and mussel communities in rivers and wadeable streams were finalized and utilized to supplement sportfish standardized electrofishing samples. Understanding river basin biotic assemblages is an important aspect of fisheries management. Changes in community structure of aquatic biota in river and tributary systems within a watershed are indicators of anthropogenic and natural disturbances. Fish and mussel communities are sensitive to a wide array of direct and indirect stresses, including the effects of point source and non-point source pollution, sedimentation and changes in substrate deposition, habitat loss, riparian zone disruption, physicochemical changes in water chemistry, and flow modification. Fish and mussels occupy positions throughout the aquatic food web and share a unique relationship. The larval mussel stage, or glochidia, is attached and parasitic on the host fish's gills. After a period of time, the larval mussel drops off of the fish and settles to the stream bottom. Inland Fisheries' Districts 5 (Lake Charles), 7 (Baton Rouge) and 8 (Lacombe) analyze species composition of fish and freshwater mussels, and conduct habitat assessments in multiple watersheds, as well as monitor sportfish parameters on the lower reaches of the watersheds. Areas sampled during FY 2017-2018 include the Tchefuncte River Sub-Basin, the Pearl River Watershed, the Calcasieu River drainage, and the Amite, Tickfaw and Blind Rivers.

AQUATIC NUISANCE SPECIES MONITORING

The "State Management Plan for Aquatic Invasive species in Louisiana" was written in 2005 and includes five objectives to help in the coordination and management of aquatic nuisance and invasive species within Louisiana. Briefly, the five objectives are to:

- Coordinate all aquatic invasive species management activities and programs within Louisiana and collaborate with other aquatic invasive species programs.
- Prevent and control nonindigenous invasive species through education.
- Eliminate locally established invasive species.
- Control the spread of established invasive species.
- Prevent the introduction of non-native species, or the spread of existing ones, through legislation and regulation.

In order to educate Louisiana citizens on the threat of aquatic nuisance and invasive species in our waterbodies, Inland Fisheries biologists conducted the following outreach and education activities during FY 2017-2018:

- Apple Snails - two Power Point presentations: Louisiana Local Coastal Zone Managers Meeting in Baton Rouge and joint biologist meeting between Arkansas Game and Fish and LDWF Inland Fish
  - Answered 376 calls and emails related to apple snail inquiries
- Asian Carp - developed Inland Fish Asian Carp FACT sheet
- Mississippi Interstate Cooperative Resource Association: Mississippi River Basin Panel - annual meeting and webinar
- Gulf and South Atlantic Regional Panel on Aquatic Invasive Species - fall meeting and webinar

A total of three apple snail surveys were conducted via watercraft and vehicles along rivers and roadways to document range expansion in the Mermentau River drainage. Sustained apple snail populations have been verified in 28 Louisiana parishes. The LDWF Inland Fisheries aquatic invasive species coordinator compiled records and locations of aquatic invasive species within Louisiana waters and added those occurrences to the USGS Nonindigenous Aquatic Species Program center database. Below is a list of aquatic invasive species monitored and logged occurrences for FY 2017-2018:

- Apple Snail - 351 reports
- Tiger Prawn - 3 reports
- Lionfish - 1 reports
- Asian Carp (bighead, black, grass, silver) - 15 reports
- Tilapia - 2 reports
- Rio Grande Cichlid - 7 anglers reporting catches
- Zebra Mussel - 2 reports
- Cuban Tree Frog - 1 report
- Purple Loosestrife - 1 report
- Armored Catfish - 1 report

FISH KILL MONITORING

LDWF is charged with managing, conserving and promoting fisheries resources in Louisiana's waters. Investigating fish and/or mussel kills is a high priority that requires the immediate attention of Fisheries personnel. LDWF is responsible for responding to fish kills in a timely manner because the cause and effects of fish kills are typically unknown at the time of initial notification. Also, fish kills are highly visible to the public and often prompt related questions that must be addressed, and they may serve as a symptom of more significant problems in an area. When responding to a fish and/or mussel kill, LDWF biologist managers refer to the American Fisheries Society Special Publication #30 "Investigation and Monetary Values of Fish and Freshwater Mussel Kills" for protocol. The selection of the most appropriate method for estimating fish kill numbers and species composition is dependent on the type of habitats involved. In some cases, strand line counts may be used, while in other cases, transects, segments or other methods are often necessary. During 2018, LDWF Office of Fisheries investigated 23 fish kills throughout the state. Most causes were attributed to naturally occurring low oxygen conditions in the rivers, lakes and marshes.

PRESENTATIONS

Daniel, R. Lake Providence Watershed Initiative: A Restoration Project in the Works. Joint Louisiana-Arkansas Agency Meeting, July 12-13, 2017. Homer, LA

Maxwell, R. Biogeography of Fishes of the Western Gulf Slope (a section of the Fishes of SWLA Master Naturalist presentation). LA-AFS Ichthyology Day Camp, December 2, 2017; Baton Rouge, LA.

Maxwell, R. The Calcasieu River, The Gem of SWLA. City of Lake Charles Speaker Series, December 11, 2017; Lake Charles, LA.

Maxwell, R. So you Want to be a Fisheries Biologist… Anacoco High School Career Day, April 26, 2018; Anacoco, LA.

McPherson, B. Restoration of Bussey Brake Reservoir. Joint Louisiana-Arkansas Agency Meeting, July 12-13, 2017. Homer, LA

Reed, B.C. The Risk of bringing the non-native Sterlet Sturgeon into an Aquaculture System in Louisiana. Presentation to the House Committee on Natural Resources and Environment on the LWC approval of Sterlet sturgeon as a Domesticated Aquatic Organism. Louisiana State Capital Bldg. Baton Rouge, Louisiana. November 8, 2017.

Reed, B.C. Update on Aquatic Invasive Species in Louisiana. Presented at the Arkansas-Louisiana Joint Meeting July 12, 2017 Lake Claiborne, Louisiana.

Reed, B.C. Update on Aquatic Invasive Species in Louisiana. Presented at the Louisiana Local Coastal Management Programs Managers Meeting May 8, 2018 Baton Rouge, Louisiana.

OYSTER LEASE PROGRAM

The leasing and permitting of state water bottoms for cultivating oysters is administered by the Office of Fisheries. The Oyster Lease Program is responsible for maintaining records, collecting revenue and issuing lease agreements for this purpose. At this time, there is a moratorium on the issuance of new leases. However, recent law changes have addressed lifting the moratorium which will require LDWF to redefine the rules and regulations relating to the leasing of water bottoms.

Currently, there are 8,020 leases covering 403,677 acres of water bottom which accounts for $1.2 million in annual revenue. This line of revenue is specifically deposited into the Public Oyster Seed Ground Development Account for the enhancement of the state's public oyster resource.

Beginning in 2013, the Office of Fisheries was tasked with issuing Alternative Oyster Culture Permits. These permits offer commercial fishermen an opportunity to cultivate oysters using alternative methods on state leases or on privately owned water bottom. To date, the Oyster Lease Program has issued permits at six sites along the coast covering approximately 80 acres of water bottom.

COMMERCIAL HARVEST

Louisiana produces nearly one-quarter of the seafood in the continental United States. Louisiana comes in second only to Alaska in terms of commercial fishing production and is home to three of the top six commercial fishing ports in the country. Seventy-eight percent of the seafood production in the Gulf of Mexico comes from Louisiana shrimpers, crabbers, oyster harvesters and fishermen. Nearly 12,000 commercial fishermen and 7,704 seafood dealers/processors and brokers register each year to provide the nation with fresh seafood.

LDWF utilizes the Trip Ticket Program to collect commercial seafood statistics. Through this program, commercial landings data are collected on a trip basis from wholesale/retail seafood dealers, crab shedders and commercial fishermen holding fresh products licenses. There were 249,265 commercial fishing trips reported in FY 2017-2018 producing in excess of 187 million pounds of seafood.

Beginning in May 2000, a computerized electronic trip ticket program was developed and made available to dealers. To date, 381 dealers use the computerized program to submit their trip ticket data. Trip ticket information has been used:

- to enhance the accuracy of stock assessments conducted by state and federal fishery management agencies.
- to extend certain inshore shrimp seasons providing additional economic opportunity to fishermen.
- to develop a crop insurance program for oyster growers.
- to estimate damages from hurricanes Katrina and Rita in 2005 and the 2010 *Deepwater Horizon* oil spill.

Along with the collection of commercial landings data, LDWF also conducts trip interviews of commercial fishermen to gather detailed information about a specific fishing trip. The federally funded program focuses on species of greatest state and federal interest.

Shrimp are the state's most valuable fishery. In FY 2017-2018, total shrimp landings measured over 98 million pounds (all species combined/heads on weight) and had a dockside value of $123.7 million. Brown shrimp landings in FY 2017-2018 measured over 40.7 million pounds (heads on weight) with a dockside value of $32.3 million, while white shrimp landings in FY 2017-2018 measured over 56 million pounds (heads-on weight) with a dockside value of $90.9 million (*Figure 2*).

Louisiana commercial blue crab landings for FY 2017-2018 totaled approximately 42 million pounds and had a dockside value of approximately $61.1 million. (*Figure 3*).

Louisiana regularly leads the nation in the production of oysters and continues to account for 40 percent of the nation's oyster landings. Among Gulf of Mexico states, Louisiana consistently ranks first in landings, accounting for nearly 85 percent of all oysters landed (*Figure 4*). Public oyster reef landings totaled approximately 453 thousand pounds and had a dockside value of approximately $3 million. Private oyster reef landings totaled approximately 12 million pounds and had a dockside value of approximately $78 million.

Louisiana commercial freshwater finfish landings for 2017-2018 totaled approximately 12.4 million pounds and included common species such as alligator gar, blue catfish, channel catfish, flathead catfish, freshwater drum, buffalo, bowfin, carp and gizzard shad. Total dockside value of these species was approximately $6 million. Wild caught crawfish landings in Louisiana for 2017-2018 was approximately 12 million pounds with a dockside value of $13.9 million.

RECREATIONAL HARVEST

LDWF now monitors recreational fisheries through its own LA Creel Program and inland creel surveys. The LA Creel Program uses dockside interviews of recreational anglers to determine catch and a telephone/email survey to determine fishing effort.

During FY 2017-2018, fisheries biologists worked a total of 1,579 LA Creel assignments and conducted approximately 11,736 interviews of recreational fishing trips along Louisiana's coast through the LA Creel Program. This resulted in a total of 31,516 anglers being surveyed and 93,565 fish being counted. During FY 2017-2018, 145,341 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 45,993 resulted in completed surveys. Approximately 860 charter captains were monitored with an estimated 188,981 charter an-

TABLE 1. *Louisiana Freshwater Creel Surveys for calendar year and fiscal year 2017-2018*

	2017-2018 CALENDAR YEAR				2017-2018 FISCAL YEAR			
	Interviews	Anglers	Trip Length	Catch Per Trip	Interviews	Anglers	Trip Length	Catch Per Trip
Largemouth Bass	1,088	1,810	4.145	2.888	539	911	4.215	2.3230
Crappie	496	780	5.11	7.252	243	384	4.880	6.884
Total	**1,584**	**2,590**	**4.6275**	**5.07**	**782**	**1,195**	**4.548**	**4.6035**

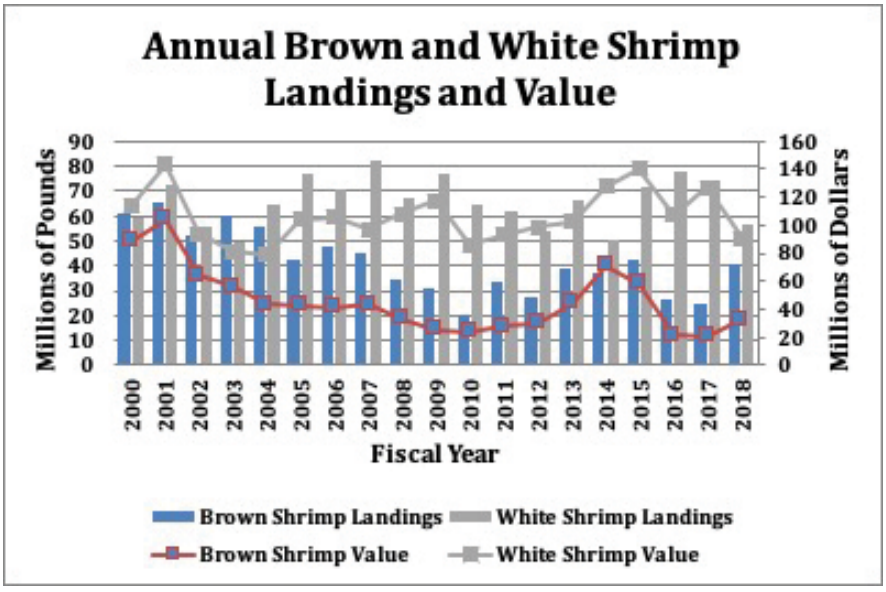


FIGURE 2. Annual white and brown shrimp landings and value (Source: LDWF trip ticket data).

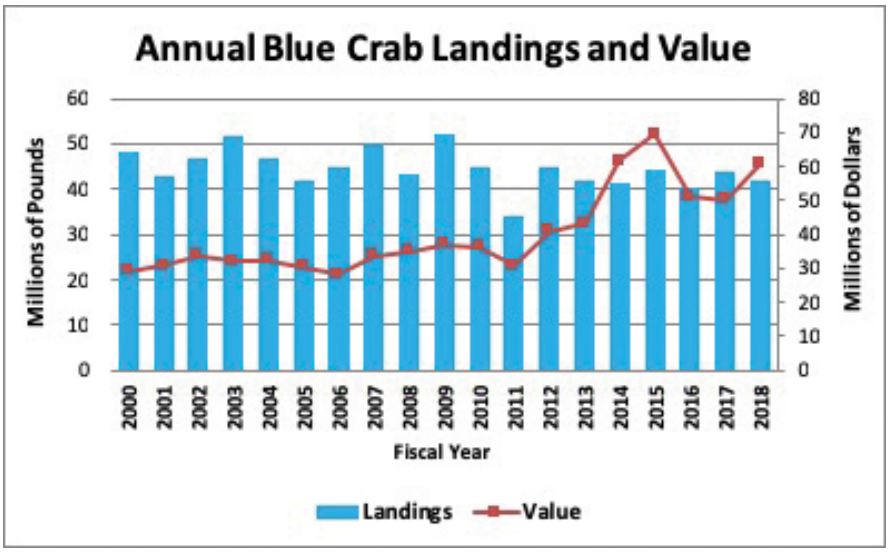


FIGURE 3. Annual blue crab dockside landings and values (source: LDWF trip ticket data).

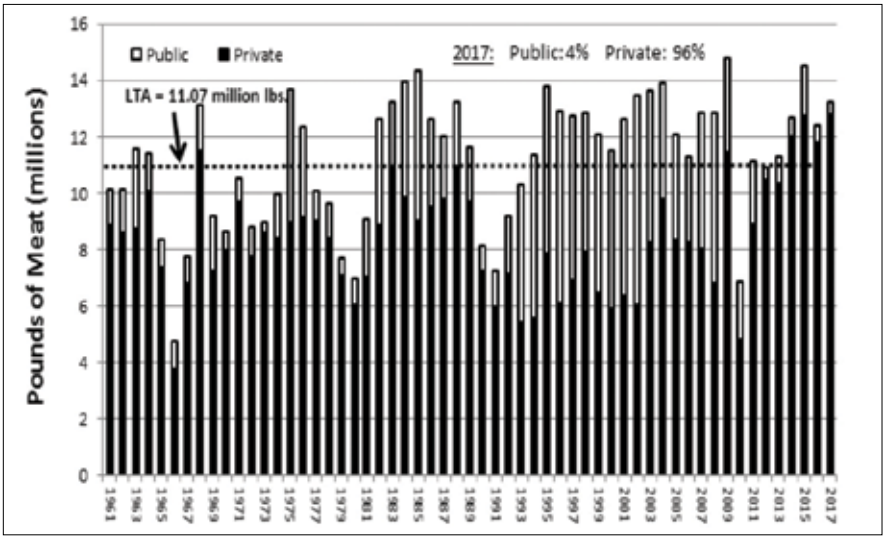


FIGURE 4. Historical Louisiana oyster landings from private oyster leases and public oyster areas.

gler trips taken during FY 2017-2018. During FY 2017-2018 using LA Creel data, it was estimated that a total of 2,146,338 recreational angler trips were taken.

A revised Inland creel procedure was developed in 2015 in order to increase the number of completed interviews, facilitate consistent methodology across all waterbodies, and enable more accurate characterization of angler activities. A monthly creel sample schedule is generated for each waterbody designated for creel survey through the Inland Fisheries waterbody prioritization procedure. This schedule consists of a random selection of survey days for each month that district biologists follow as they conduct the surveys.

Creel surveys put the fisheries biologist in direct contact with the fishermen. Information collected includes species sought and species caught, distance traveled, time fished, number caught and released, and length and weight measurements of all black bass and crappie harvested. Six recreational creel surveys were conducted on inland waters during FY 2017-2018. These lakes and rivers include Lake Bistineau, Caney Creek Reservoir, Lacassine National Wildlife Refuge, Spring Bayou, Lake Verret and Turkey Creek Lake.

During 2017-2018, fisheries biologists conducted 1,584 interviews of 2,590 recreational bass and crappie anglers on Louisiana's freshwater lakes and rivers. Fishing trips averaged 4.6 hours in length and recreational anglers targeting bass caught an average of 2.9 fish per trip while crappie anglers averaged 6.9 fish per trip (*Table 1*).

ASSESSMENT

Fisheries management involves sampling, analysis and development of recommendations to renovate and enhance fish populations. Information collected is used to evaluate the status of the fisheries through stock assessments, monitoring trends and evaluating the benefits of regulations.

STOCK ASSESSMENT

Marine

An updated stock assessment of striped mullet was completed and presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature in February 2018. This stock assessment used a statistical catch at age model to estimate annual time-series of spawning stock biomass and fishing mortality rates. Current status of the stock was

TABLE 2. Schedules of Louisiana Largemouth Bass Stock Assessments - 30 waterbodies

WATERBODY	YEARS CONDUCTED	SAMPLING STATUS	ASSESSMENT STATUS
Atchafalaya Basin	2009 - 2011	Completed	Completed
Atchafalaya Basin Follow-up Assessment	2017 - 2019	Ongoing	Ongoing
Lake Bistineau	2016 - 2018	Completed	Ongoing
Black-Clear Lake	2010 - 2012	Completed	Completed
Blind River Complex	2018 - 2020	Ongoing	Ongoing
Lake Bruin	2013 - 2015	Completed	Completed
Bundick Lake	2015 - 2017	Completed	Ongoing
Caddo Lake	2011 - 2013	Completed	Completed
Calcasieu River	2012 - 2014	Completed	Completed
Cane River Lake	2015 - 2017	Completed	Ongoing
Caney Creek Reservoir	2014 - 2016	Completed	Completed
Lake Cataouatche	2010 - 2012	Completed	Completed
Chicot Lake	2010 - 2012	Completed	Completed
Lake Concordia	2010 - 2012	Completed	Completed
Cross Lake	2010 - 2012	Completed	Completed
Lake D'Arbonne	2010 - 2012	Completed	Completed
False River	2010 - 2012	Completed	Completed
Grand Bayou Reservoir	2015 - 2017	Completed	Ongoing
Grassy, Verret, Palourde Complex	2015 - 2017	Completed	Ongoing
Henderson Lake	2017 - 2019	Ongoing	Ongoing
Iatt Lake	2013 - 2015	Completed	Completed
Lacassine Pool NWR	2017 - 2019	Ongoing	Ongoing
Larto-Saline Complex	2015 - 2017	Completed	Ongoing
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Old River - Raccourci	2015 - 2017	Completed	Ongoing
Red River (Pools 1-5)	2013 - 2015	Completed	Completed
Lake St. John	2018 - 2020	Ongoing	Ongoing
Spring Bayou Complex	2018 - 2020	Ongoing	Ongoing
Toledo Bend Reservoir	2010 - 2012	Completed	Completed
	2018 - 2020	Ongoing	Ongoing
Turkey Creek Lake	2016 - 2018	Completed	Ongoing
Vernon Lake	2010 - 2012	Completed	Completed

TABLE 3. Schedules of Louisiana Crappie Stock Assessments - 20 waterbodies

WATERBODY	YEARS CONDUCTED	SAMPLING STATUS	ASSESSMENT STATUS
Lake Bistineau	2016 - 2018	Ongoing	Ongoing
Lake Bruin	2013 - 2015	Completed	Completed
Bundick Lake	2012 - 2014	Completed	Completed
Caddo Lake	2010 - 2012	Completed	Completed
Caney Creek Reservoir	2014 - 2016	Completed	Completed
Cross Lake	2010 - 2012	Completed	Completed
Lake D'Arbonne	2010 - 2012	Completed	Completed
Fausse Point	2013 - 2015	Completed	Completed
Grand Bayou Reservoir	2015 - 2017	Completed	Completed
Iatt Lake	2013 - 2015	Completed	Ongoing
Larto-Saline Complex	2009 - 2012	Completed	Completed
Lake Louis	2013 - 2015	Completed	Completed
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Old River - Raccourci	2009 - 2013	Completed	Completed
Red River (Pool 5)	2013 - 2015	Completed	Completed
Sibley Lake	2015 - 2017	Completed	Completed
Spring Bayou Complex	2016 - 2018	Ongoing	Ongoing
Toledo Bend Reservoir	2009 - 2011	Completed	Completed
Turkey Creek Lake	2016 - 2018	Ongoing	Ongoing
Vernon Lake	2009 - 2011	Completed	Completed

determined with estimates of reproductive potential. Based on results of this assessment, no overfishing is currently occurring and the stock is not considered overfished.

An updated stock assessment of blue crab was completed in April 2018. This stock assessment used a catch-survey model to estimate annual time-series of spawning stock biomass and fishing mortality rates. Based on results of this assessment, no overfishing is currently occurring and the stock is not considered overfished.

LA Creel

The Stock Assessment Section continues to provide weekly marine recreational landings estimates from the LA Creel Survey to marine fishery managers. Stock Assessment Section personnel also developed a calibration procedure to allow hind-casting of the LA Creel Survey estimates to the historic recreational landings estimate time-series for use in future stock assessments.

Inland

Fishery-independent and fishery-dependent surveys are being conducted on Louisiana waterbodies with important largemouth bass and crappie fisheries to provide information to inland fishery managers to make science-based management decisions (*Tables 2 & 3*). Fishery-independent surveys are conducted for three consecutive years on each waterbody to provide population-specific information. A creel survey is conducted one of these years to provide fishery-specific information.

Assessment analyses include age-structured population models to simulate each fishery's response to multiple size regulations. Results provide information to inland fishery managers to better understand the effects of current harvest regulations on their fisheries, while also providing a baseline to compare future regulation changes against. Final project reports are available for waterbodies with completed sampling, describing the status of each waterbody's largemouth bass (or crappie) population and fishery, as well as a comparison of population and fishery characteristics among all waterbodies included in this project. Citations for reports completed in the past year are presented below.

Publications

Allgood, T. and J. West. 2018. Sibley Lake Crappie: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries: Technical Report Series TS-C-16.

West, J. 2018. Update Assessment of Striped Mullet *Mugil cephalus* in Louisiana Waters - 2018 Report. Report to the Louisiana Legislature by the Wildlife and Fisheries Commission.

West, J., H. Blanchet, and P. Cagle. 2018. Update Assessment of Blue Crab *Callinectes sapidus* in Louisiana Waters - 2018 Report. Louisiana Department of Wildlife and Fisheries.

Presentations

Sibley, J. NOI to Remove Slot Limit from Caney Creek Reservoir. Louisiana Wildlife and Fisheries Commission Meeting, September 7, 2017, Baton Rouge, Louisiana

Sibley, J. NOI to Remove Slot Limit from Caney Creek Reservoir. Public Meeting at Jimmie Davis State Park, September 25, 2017. Chatham, Louisiana

MANAGEMENT PLANS

INLAND WATERBODY MANAGEMENT PLANS

Inland Waterbody Management Plans provide a detailed compilation of lake description, history, authorities, synopsis of fisheries and vegetation sampling data, analyses, corrective measures needed, and recommended actions. During FY 2017-2018, the 36 management plans below were updated and approved. A total of 77 management plans are now available to the public on the LDWF website.

Waterbody management plans completed during FY 2017-2018 and available to the public on the LDWF website:

- Amite River
- Atchafalaya Basin
- Barataria Basin
- Bartholomew Lake
- Bayou DeSiard
- Bayou Lacombe Complex
- Blind River
- Black Bayou Reservoir
- Cypress Bayou Reservoir
- Cane River Lake
- Caney Creek Reservoir
- Chicot Lake
- Concordia Lake
- Crooked Creek Lake
- D'Arbonne Lake
- False River
- Henderson Lake
- Kincaid Lake
- Lake Bistineau
- Lake Lafourche
- Larto/Saline Complex
- Lake St. Joseph
- Lake St. John
- Lake Fields-Lake Long
- Mill Creek Reservoir
- Nantachie Lake
- Providence Lake
- Raccourci Old River
- Sabine River
- Sibley Lake
- Spanish Lake
- Spring Bayou
- St. Joseph Lake
- Tickfaw River
- Toledo Bend Reservoir
- Turkey Creek Lake

INLAND VEGETATION MANAGEMENT PLANS

Inland Vegetation Management Plans provide a detailed compilation of lake description, vegetation history and current status, management limitations, implemented plant control measures, and recommended actions. During FY 2017-2018, 79 vegetation management plans were completed and/or updated and approved. A total of 81 management plans are now available to the public on the LDWF website, and a discussion of nuisance vegetation can be found in the Fishing Access and Opportunity section.

MARINE FISHERY MANAGEMENT PLANS

LDWF has been developing new and updating existing fishery management plans to provide a mechanism to strategically implement science-based management recommendations for proactively responding to and resolving fisheries issues. The goal of these plans is to ensure long-term conservation and sustainable use of these fisheries resources for the maximum environmental, social and economic benefit to the state and its citizens and visitors.

- LDWF created a document to guide the development of future fishery management plans to ensure they are consistent with federal fisheries conservation and management practices and international best management practices, mainly applicable principles and standards of the United Nations Food and Agriculture Organization's Code of Conduct for Responsible Fisheries.
- Using the guidance document referenced above, LDWF previously completed new fishery management plans for blue crab, shrimp and oyster. Staff review new research and monitoring information for these species every year, document progress toward fishery management goals, and will fully review and revise management plans every five years, or sooner if necessary. LDWF will prioritize development of additional new fishery management plans for other species based on commercial, recreational, and ecological significance and management needs.
- These fishery management plans are also complemented by United Nations Food and Agriculture Organization-based self-assessments to document consistency with best management practices and identify any potential gaps in information or management to address in future plan updates.

MANAGEMENT RECOMMENDATIONS

Through utilization of the previously mentioned recreational and commercial sampling techniques, fisheries managers then analyze the resulting data to develop recommendations to manage and enhance fish populations. The information collected is used to produce recommendations for setting seasons and harvest limits and to monitor the species found in an area over time.

SHRIMP MANAGEMENT

Greater flexibility in managing the shrimp resource is now provided through the use of a basin type management approach, as opposed to the historical zone approach. Louisiana's major estuarine basins include the Pontchartrain Basin, Mississippi River Basin, Barataria Basin, Terrebonne Basin, Atchafalaya River Basin, Vermilion-Teche River Basin, Mermentau River Basin, Calcasieu Basin and Sabine River Basin.

Based on analysis of historical data, as well as data generated from biological sampling conducted by fisheries biologists, the following shrimp management recommendations were made to the Secretary of LDWF and the Louisiana Wildlife and Fisheries Commission. These measures were implemented during FY 2017-2018.

Lake Pontchartrain Basin and Portions of Mississippi River Basins

<u>2017 - Spring Inshore Shrimp Season</u>

Opened at 6:00 a.m. May 15, 2017, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.

Closed at 6:00 p.m. July 14, 2017, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River except in the following areas:

- Lake Pontchartrain, Chef Menteur and Rigolets Passes, Lake Borgne, the Louisiana portion of Mississippi Sound, and the open waters of Breton and Chandeleur Sounds.

Closed at 6:00 p.m. July 24, 2017, in Lake Pontchartrain, Chef Menteur and Rigolets passes, Lake Borgne, and the Louisiana portion of Mississippi Sound except in the following areas:

- Breton and Chandeleur sounds.

2017 - Fall Inshore Shrimp Season

Opened at 6:00 a.m. Aug. 18, 2017, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.

Closed at official sunset Dec. 18, 2017, from the MS/LA state line westward to South Pass of the Mississippi River except for the following waters:

- Chef Menteur and Rigolets Passes, Lake Borgne, Mississippi Sound, Mississippi River Gulf Outlet, a section of the Gulf Intracoastal Waterway in Orleans parish from the Gulf Intracoastal Waterway East Closure Sector Gate westward to the Gulf Intracoastal Waterway intersection with the Inner Harbor Navigation Canal, and the open waters of Breton and Chandeleur Sounds as bounded by the double-rig line described in R.S. 56:495.1(A)2.

Closed at official sunset Jan. 26, 2018, in Lake Borgne, Mississippi Sound, and the Mississippi River Gulf Outlet, and a section of the Gulf Intracoastal Waterway, except for the following waters:

- The open waters of Breton and Chandeleur sounds as described by the double-rig line.

2018 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 9, 2018, from the southern shore of the Mississippi River Gulf Outlet to the eastern shore of South Pass of the Mississippi River.

Opened at 6:00 a.m. May 28, 2018 from the Mississippi/Louisiana state line to the southern shore of the Mississippi River Gulf Outlet

Western Mississippi River, Barataria, Terrebonne, Atchafalaya River and Vermilion-Teche River Basins

2017 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 8, 2017, from the eastern shore of South Pass of the Mississippi River to the western shore of Freshwater Bayou Canal.

Closed at 6:00 p.m. June 23, 2017, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

2017 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 18, 2017, from the eastern shore of South Pass of the Mississippi River westward to the Atchafalaya River Ship Channel Buoy Line.

Opened at 6:00 a.m. Aug. 18, 2017, from the Atchafalaya River Ship Channel Buoy Line westward to the western shore of Freshwater Bayou Canal.

Closed at official sunset Dec. 18, 2017, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

FIGURE 5. 2017 Spring Shrimp Season Closure Map.

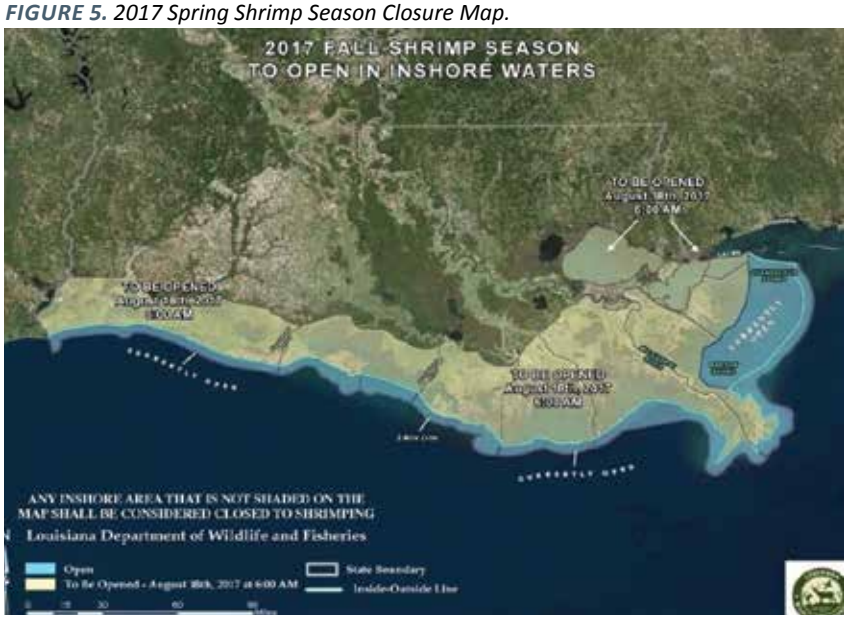


FIGURE 6. 2017 Fall Shrimp Season Opening Map.

FIGURE 7. 2018 Spring Inshore Shrimp Season Opening Map.

2018 - Spring Inshore Shrimp Season
Opened at 6:00 a.m. April 30, 2018, from the eastern shore of South Pass of the Mississippi River to the western shore of Freshwater Bayou Canal.

Mermentau, Calcasieu and Sabine River Basins

2017 - Spring Inshore Shrimp Season
Opened at 6:00 a.m. May 15, 2017, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.
Closed at 6:00 p.m. July 14, 2017, from the western shore of Freshwater Bayou Canal to the LA/TX state line.

2017 - Fall Inshore Shrimp Season
Opened at 6:00 a.m. Aug. 18, 2017, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.
Closed at official sunset Dec. 18, 2017, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

2018 - Spring Inshore Shrimp Season
Opened at 6:00 a.m. May 21, 2018, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Offshore Shrimp Seasons
Closed at official sunset Jan. 26, 2018, in the following waters:
- That portion of state outside waters extending a distance of 3 nautical miles seaward of the inside/outside shrimp line as described in R.S. 56:495(A) from the northwest shore of Caillou Boca at -90 degrees 50 minutes 27 seconds west longitude westward to the western shore of Freshwater Bayou Canal at -92 degrees 18 minutes 33 seconds west longitude.

Opened at 6:00 a.m. April 2, 2018, in the following waters:
- The area extends a distance of three nautical miles, seaward of the inside/outside shrimp line from the inside/outside shrimp line as described in R.S. 56:495 seaward to the 3-mile line, from the northwest shore of Caillou Boca at -90 degrees 50 minutes 27 seconds west longitude westward to the Atchafalaya River Ship Channel at Eugene Island as delineated by the red buoy line

Opened at 6:00 a.m. April 24, 2018, in the following waters:
- The area extends a distance of three nautical miles, seaward of the inside/outside shrimp line from the Atchafalaya River Ship Channel at Eugene Island as delineated by the Channel red buoy line westward to western shore of Freshwater Bayou Canal at -92 degrees 18 minutes 33 seconds west longitude.

BLUE CRAB MANAGEMENT

The Louisiana blue crab fishery is the largest blue crab fishery in the United States and it accounts for more than half of the total blue crab harvest in the Gulf of Mexico. Landings of blue crab in Louisiana averaged 44 million pounds annually from 2000-2017. The dockside value of the harvest over that same time period averaged $39.6 million annually (prices not adjusted for inflation).

Management of the blue crab fishery strives for the maintenance of the stock while providing for long-term benefits to the fishery. Key objectives of management include:
- Conservation, restoration and enhancement of habitat essential to blue crabs.
- Reductions in juvenile blue crab incidental mortality, wasteful harvesting practices within the fishery and conflicts among crab fishermen and other user groups.
- Enhancement of social and economic benefits derived from resource use.
- The assessment of biological, social and economic impacts of existing and proposed fisheries management regulations affecting the fishery.
- These objectives are met via licensing, record keeping and reporting requirements, minimum size limit, time, gear and area restrictions.

Blue Crab Stock Assessment
The stock assessment for blue crab was updated in early 2018. The assessment indicated that the Louisiana blue crab stock is currently not overfished or experiencing overfishing, but crossed the overfished benchmark in 2015. The assessment also indicated that the fishing mortality rates during the 2012 and 2014 seasons had exceeded their targets and were very close to their overfishing benchmarks.

Management Options
Due to the fact that the overfished benchmark was crossed in 2015, LDWF and the Crab Task Force entered into discussions on potential changes to the fishery to allow the stock to recover. Options that were discussed included a seasonal closure of the commercial blue crab fishery, raising the size limits of blue crab, restricting the harvest of immature female blue crab, increasing license fees, and implementing trap limits. In 2016, the Louisiana Wildlife and Fisheries Commission promulgated a rule that prohibited the commercial harvest of blue crabs during a 30-day period that began the third Monday in February. This rule was scheduled to take place during the 2017, 2018 and 2019 blue crab harvest seasons.

After the 30-day closure in 2017, many members from the crab industry voiced concerns over lost market shares. LDWF brought another management option to the Crab Task Force that would prohibit the commercial harvest of mature female blue crab for a 60-day period beginning March 1. The Crab Task Force voted in favor of this management option. The Commission promulgated this rule and it took effect for the 2018 blue crab harvest season and is also scheduled to be in effect for the 2019 blue crab harvest season.

The 30-day prohibition on the commercial harvest of blue crabs beginning the third Monday in February 2017 was estimated to reduce blue crab landings by approximately 50 percent, or 1,381,609 pounds. After this closure took place, analysis of trip ticket data indicated that actual commercial blue crab landings were reduced by 1,354,263 pounds. The 2018 restriction on the commercial harvest of mature female blue crab beginning March 1 and lasting 60 days was estimated to reduce blue crab landings by 1,580,392 pounds. After the 60-day restriction took place, analysis of trip ticket data indicated that actual commercial blue crab landings were reduced by 1,927,778 pounds.

Crab Trap Removal Program
The removal of derelict crab traps from fishing grounds reduces navigational risks to boaters and threats to public safety while reducing mortality of incidental species captured in traps, potentially increasing the number of crabs available for harvest by preventing crab mortalities in abandoned, out-of-use traps.

In 2017, the Louisiana Wildlife and Fisheries Commission promulgated a rule defining seven distinct derelict crab trap closure areas. The closure areas and dates were the following:
1. The first closure would have taken place in the upper Barataria basin and adjacent marshes, west of Port Sulphur, beginning at 12 a.m. Thursday, Feb. 1, 2018, through 11:59 p.m. Wednesday, Feb. 14, 2018.
2. The second closure would have taken place in Lake Pontchartrain, west of the Lake Pontchartrain Causeway, beginning at 12 a.m. Thursday, Feb. 1, 2018, through 11:59 p.m. Feb. 10, 2018.
3. The third closure took place in Sabine Lake and ran concurrent with the Texas

TABLE 4. *Number of crab trap closures and numbers of trap removed annually.*

YEAR	AREA(S)	TRAPS	BOAT DAYS
2004	2	6,894	90+
2005	4	4,623	50+
2006	1	2,935	31+
2007	2	1,495	15
2008	1	1,234	3
2009	1	788	n/a
2010	1	477	n/a
2011	1	1,100	n/a
2012	2	2,798	66
2013	2	969	32
2014	1	1,051	24
2015	1	422	9
2016	3	2,580	50+
2017	6	5,674	68
2018	5	4,061	68
Total	33	37,101	506+

FIGURE 8. *Map of derelict crab trap closures and cleanups since 2004.*

Removal of derelict crab traps from a closure area.

Parks and Wildlife Department closure of Sabine Lake. Both the Louisiana and Texas portions of Sabine Lake were temporarily restricted for the use of crab traps to eliminate confusion during trap cleanup efforts. The Sabine Lake crab trap closure was scheduled to begin at 12 a.m. Feb. 16, 2018, through 11:59 p.m. Feb. 25, 2018.

4. The fourth cleanup was located in the Pontchartrain Basin, just north of the Mississippi River - Gulf Outlet, including the southern portion of Lake Borgne and the area around Bayou La Loutre. This closure began at 12:00 a.m. Feb. 16, 2018, through 11:59 p.m. March 3, 2018.
5. The fifth closure area was located in the Pontchartrain Basin, within the area from Delacroix to the Mississippi River - Gulf Outlet, beginning at 12:00 a.m. March 4, 2018, through 11:59 p.m. March 19, 2018.
6. The sixth closure area took place in the Terrebonne Basin, in an area from Dulac south of Cocodrie beginning at 12:00 a.m. March 16, 2018, through 11:59 pm March 29, 2018.
7. The seventh closure area was in the Vermilion-Teche Basin, in the West Cote Blanche Bar area beginning at 12:00 a.m. March 18, 2018, through 11:59 pm March 31, 2018.

Due to extreme winter weather and fishermen unable to access their crab traps before the first two derelict crab trap closure areas took place, the Secretary of LDWF declared two closures canceled (Barataria and the first Pontchartrain).

One volunteer day was scheduled in the Terrebonne Basin. This cleanup, headed by LDWF, was based out of the Louisiana Universities Marine Consortium (LUMCON) Center located at 8124 LA-56, Chauvin, LA 70433, on March 24, 2018 from 8:00 am - 2:00 pm. Volunteers from the Coastal Conservation Association, the Barataria-Terrebonne National Estuary Program, Kinetica, LUMCON and members of the general public worked with LDWF personnel to collect more than 400 traps during the event.

The Lake Pontchartrain Basin Foundation headed the two Pontchartrain Basin closure areas. The Lake Pontchartrain Basin Foundation and members of the public removed more than 3,200 traps from within these two closure areas. LDWF and Texas Parks and Wildlife removed 150 derelict crab traps from the Sabine Basin, while LDWF staff removed 227 traps from the Vermilion-Teche Basin.

OYSTER MANAGEMENT

Oysters provide both important economic and ecological benefits to Louisiana. They act as barometers for the overall health of the ecosystem, providing forage and shelter habitat for a variety of fish and invertebrate species. Oysters improve water quality through filter-feeding activities, affect estuarine current patterns, and may provide shoreline

TABLE 5. *2017-2018 Oyster season opening and closing dates on the public oyster areas of Louisiana.*

PUBLIC OYSTER AREA	SEASON OPENING	SEASON CLOSURE
Primary Public Grounds East of MS River and North of MS River Gulf Outlet, (excluding Drum Bay sacking area and Mississippi Sound): SEED	Nov. 13, 2017	Nov. 14, 2017
Primary Public Grounds East of MS River and North of MS River Gulf Outlet, including Lake Borgne(excluding Mississippi sound): SACK—50 sack daily limit, lowered to 25 sack limit (11/28/17)	Nov. 13, 2017	Apr. 30, 2018
Lake Borgne-- Emergency opening (Bonnet Carré Spillway)-	Mar 12, 2018	Mar 17, 2018
LDH Harvest Zones 1 & 2 Special LDH permit relay—transplant bedding only Lake Borgne/MS Sound	MAR. 24, 2018	APRIL 7, 2018
Primary Public Grounds East of MS River and South of MS River Gulf Outlet (excluding Bay Long): SEED	CLOSED	
Primary Public Grounds East of MS River and South of MS River Gulf Outlet American Bay Sacking Only Area (50 sack daily limit. Lowered to 25 daily sack limit Nov. 28, 2017)	Nov. 13, 2017	Apr. 30, 2018
Little Lake, Barataria Bay,	CLOSED	
Hackberry Bay Public Oyster Seed Reservation	CLOSED	
Bay Junop, Lake Mechant	CLOSED	
Sister Lake Public Oyster Seed Grounds SEED	Nov. 13, 2017	Nov. 14, 2017
Sister Lake : SACK (35 sack daily limit, lowered to 25 daily sack limit Nov. 28, 2017) :	Nov 13, 2017	Dec. 22, 2017
Lake Tambour, Deep Lake, Lake Felicity , Lake Chien Public Oyster Seed Ground	CLOSED	
Vermilion/East & West Cote Blanche/Atchafalaya Bay Public Oyster Seed Grounds: SEED	Nov. 13, 2017	Mar. 12, 2018
Vermilion/East & West Cote Blanche/Atchafalaya Bay Public Oyster Seed Grounds: SACK	NOV. 13, 2017	APRIL 30, 2018
Calcasieu Lake - West Cove Only (7 sack daily limit)	Nov. 1, 2017	April 30, 2018
Calcasieu Lake - East Cove	CLOSED	
Calcasieu Lake Extended Season (West Cove only)	May 1, 2018	May 15, 2018

stabilization. Due to their economic and ecological importance, wise management of the public oyster resource is critically important to ensure that this valuable species continues to thrive in Louisiana's coastal areas.

The Office of Fisheries Mollusk Program is responsible for the oyster resource on nearly 1.7 million acres of public oyster seed reservations, public seed grounds and public oyster areas. Seed grounds are designated by the Louisiana Wildlife and Fisheries Commission and include a large continuous area east of the Mississippi River as well a portion of the Vermilion/Cote Blanche/Atchafalaya Bay system. Seed reservations and the public oyster areas of Calcasieu and Sabine lakes are designated by the legislature. LDWF manages four seed reservations, including one east of the Mississippi River (Bay Gardene), one in the Barataria Bay system (Hackberry Bay) and two in Terrebonne Parish (Sister Lake and Bay Junop).

State laws mandate that LDWF can open the oyster season on Louisiana public seed grounds on the first Wednesday following Labor Day of each year and close these areas no later than April 30 of each year. However, the Louisiana Wildlife and Fisheries Commission is authorized to extend the season beyond April 30, provided sufficient stocks are available for harvest. The secretary of LDWF may close seasons or areas as needed, based on biological data or if enforcement problems are encountered. The Secretary Is also authorized to take emergency action to reopen areas previously closed if the threat to the resource has ended and to open areas if substantial oyster resources are located.. The Secretary can also delay the season or close certain areas where significant spat catch has occurred with good probability of survival, or if an excess amount of shell in oyster loads occurs. Management practices often use rotational openings of the four oyster seed reservations in alternating years. The public seed grounds may be opened to the harvest of seed oysters between the first Wednesday following Labor Day and the second Monday in October; after which the public grounds may be opened to harvest of market-size oysters.

In FY 2017-2018, the oyster season was not as productive on public grounds due to oyster stocks being well below average and due to subsequent area closures. A more conservative management approach is essential to rebuild populations and prolong the life of restoration investments (cultch plants). Based on harvest estimates collected from fishermen interviews on the water, the public oyster areas produced approximately 36,265 barrels of seed oysters and 35,195 sacks of market-size oysters during the season. The majority of harvest came from the Mississippi Sound area of the public grounds, where approximately 25,630 barrels (seed) and 17,872 sacks (market sized) were harvested. These harvest numbers include a special five-day bedding season and a special 15-day Louisiana Department of Health transplant season that occurred in the Mississippi Sound area due to the opening of the Bonnet Carré Spillway. Sister Lake produced the next sizeable share of the market-oyster harvest, with approximately 12,645 sacks of oysters harvested.

MARINE FINFISH MANAGEMENT

The primary objective of the finfish program is to make rational recommendations for the management of coastal finfish stocks based on a database of scientific information. The information in the database is collected through fishery-independent and fishery-dependent sampling.

The following management recommendations were made to the Secretary of LDWF and the Louisiana Wildlife and Fisheries Commission and implemented during FY 2017-2018:

<u>July 2017</u>

- Commercial king mackerel season opened on July 1 at 12:01 a.m., concurrent with a federal opening of the 2017-2018 harvest season.
- Commercial fisheries for small coastal sharks re-opened July 1 following an annual seasonal closure from April 1 - June 30.
- At its regular July meeting, the Louisiana Wildlife and Fisheries Commission adopted a Notice of Intent to modify the recreational bag limit of king mack-

erel and the commercial season for the harvest of king mackerel. Changes proposed included increasing the daily bag and possession limit of recreationally harvested king mackerel from two to three fish per day. Further proposed changes are intended to codify the long standing practice of opening the commercial king mackerel season on July 1 of each year. Public comments on the proposed rule were accepted through Sept. 7 and the proposed changes published as final on Nov. 20.

August 2017

- Louisiana waters remained closed for 2017, after the annual June-July seasonal closure, for the commercial harvest of greater amberjack concurrent with an earlier closure in federal waters.
- Louisiana waters remained closed for 2017, after the annual June-July seasonal closure, for the recreational harvest of greater amberjack concurrent with an earlier closure in federal waters.
- Louisiana waters remained closed for 2017, after the annual June-July seasonal closure, for the recreational harvest of gray triggerfish concurrent with an earlier closure in federal waters for the entirety of 2017.

September 2017

- Louisiana closed the season for the recreational harvest of red snapper on Sept. 4, 2017, at 11:59 p.m., concurrent with a federal closure.

October 2017

- Louisiana opened the commercial season for the harvest of striped mullet on Oct. 16, 2017. Louisiana closed state waters for the commercial harvest of king mackerel on Oct. 16, 2017, concurrent with a closure in federal waters.

November 2017

- Louisiana waters closed for the commercial harvest of gray triggerfish on Nov. 18, 2017, concurrent with a closure in federal waters.

December 2017

- Louisiana waters closed for the commercial harvest of small coastal sharks on Dec. 31, 2017, concurrent with a closure in federal waters.
- Commercial fishery for the harvest of spotted seatrout closed on Dec. 31, 2017.
- Recreational fishery for the harvest of gag closed on Dec. 31, 2017, concurrent with a seasonal closure in federal waters.

January 2018

- Commercial fishery for small coastal sharks opened at 12:01 a.m. on Jan. 1, 2018, concurrent with an opening in federal waters.
- All Louisiana waters closed to the commercial harvest of striped mullet with a mullet strike net on Jan. 15, 2018.
- Commercial fishery for the harvest of spotted seatrout opened on Jan. 2, 2018.
- Louisiana closed the season for the recreational harvest of gray triggerfish in state waters, concurrent with a closure in federal waters on Jan. 16, 2018.
- Louisiana closed the season for the recreational harvest of greater amberjack in state waters, concurrent with a closure in federal waters, on Jan. 27, 2018, with a reopening scheduled Aug. 1, 2018..

February 2018

- The annual stock assessment for striped mullet was presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature.

March 2018

- Louisiana opened the season for the recreational harvest of gray triggerfish in state waters, concurrent with an opening in federal waters on March 1, 2018.
- Louisiana closed the commercial season for the harvest of large coastal sharks on March 13, 2018, concurrent with a federal closure.
- Louisiana opened the commercial season for the harvest of bait menhaden on March 15, 2018.

April 2018

- Louisiana waters closed to the recreational and commercial harvest of all sharks on April 1, 2018, consistent with an annual state closed season from April 1 - June 30.
- At its regular April 2018 meeting, the Louisiana Wildlife and Fisheries Commission adopted a Notice of Intent to modify rules and regulations for the harvest of reef fish. Changes proposed included reductions in the bag limits of gray triggerfish to no more than one per person, of red grouper to no more than two in aggregate, and mutton snapper to no more than five in aggregate. Proposed recreational size limit changes include increasing the minimum size limit of hogfish, gray triggerfish, and mutton snapper to 14 inches fork length, 15 inches fork length, and 18 inches total length, respectively. Commercial proposed changes included an increase in gray triggerfish trip limits to 16 and an increase in gray triggerfish minimum size to 15 inches fork length. Further commercial size limit proposed changes include an increase in mutton snapper and gag minimum size limits to 18 inches and 24 inches total length, respectively. Proposed recreational season changes include adding a greater amberjack closed season from Jan. 1 - April 30 and Nov. 1 - Dec. 31 of each year and adding a closed season for gray triggerfish from Jan. 1 through the end of February of each year. Public comments on the proposed rule were accepted through June 7, 2018, and the proposed changes are expected to be published as final on Aug. 20, 2018.
- Louisiana waters remained closed for the commercial harvest of greater amberjack for 2018 after a seasonal closure, concurrent with a closure in federal waters.

May 2018

- Louisiana waters opened to the recreational harvest of greater amberjack on May 1, 2018, concurrent with an opening in federal waters.
- Louisiana waters opened, seven days a week, to the recreational harvest of red snapper on May 25, 2018, in conjunction with an Exempted Fishing Permit issued by NOAA Fisheries that allowed recreational harvest of red snapper in federal waters during times and seasons set by the Louisiana Wildlife and Fisheries Commission.
- Louisiana waters closed to the recreational harvest of greater amberjack on May 31, 2018, concurrent with a closure in federal waters.

June 2018

- Louisiana waters closed for the recreational harvest of gray triggerfish on June 1, 2018, concurrent with a seasonal closure in federal waters.
- Louisiana waters opened for the recreational harvest of gag on June 1, 2018, concurrent with a seasonal opening in federal waters.

***LEFT:** The SEAMAP Shrimp and Groundfish survey is LDWF's longest running offshore fisheries independent survey, with LDWF first participating n 1982. **RIGHT:** As part of the SEAMAP Vertical Line survey, LDWF deployed vertical lines at 100 structured bottom sites statewide. Sites surveyed included standing petroleum platforms, artificial reefs, and natural reefs.*

FISHERIES RESEARCH

GRAND ISLE LABORATORY

The Fisheries Research Lab, located in Grand Isle on the shore of Barataria Bay, is one of the richest estuarine complexes in the Gulf of Mexico. While fisheries research and monitoring is conducted throughout the state, the Fisheries Research Lab is the base for much of this work within the Office of Fisheries. This ideal location allows for the research and monitoring of many of Louisiana's key recreational and commercial marine species including offshore species that are just a short boat ride away. The Fisheries Research Lab also provides fisheries biologists with the ability to develop and conduct additional research projects, collecting vital information for the management of Louisiana's aquatic resources. Along with being a home-base for fisheries research projects, the lab also serves as a place that public, state and federal partners can utilize, as well as other entities engaged in fisheries research, management, enforcement, coastal restoration and marine education.

Southeast Area Monitoring and Assessment Program (SEAMAP)

SEAMAP is a cooperative state, federal and university program designed for the collection, management and dissemination of fishery-independent biological and environmental data of the coastal waters (state and EEZ) off the southeastern United States, Caribbean and northern Gulf of Mexico. Since 1981, SEAMAP has collected data on fish stocks that are managed by either state or federal governments. Louisiana takes part in four components of the SEAMAP program: shrimp/groundfish, icthyoplankton, vertical line and bottom longline. The surveys are conducted by teams of three to nine fisheries biologists who collect, process and enter data. In addition, all surveys collect environmental parameters including a water column profile and water samples from bottom, middle and surface depths for chlorophyll measurements. These surveys are conducted from April through October and the following summaries are based on the calendar year.

SEAMAP Shrimp/Groundfish Survey

The SEAMAP Shrimp/Groundfish Survey collects information to characterize shrimp and groundfish assemblages west of the Mississippi River using a SEAMAP standardized 42-foot trawl in nearshore waters along the Louisiana coast. Icthyoplankton stations are also sampled during the summer survey to provide information on the occurrence, abundance and geographical distribution of eggs, larvae and juvenile fishes and invertebrates, with 60-cm bongo nets and 1x2m neuston nets. Icthyoplankton samples are field processed and transferred to the NMFS Pascagoula Laboratory for transshipment to the Polish Sorting and Identification Center. Shrimp/Groundfish surveys are conducted during the summer and fall, and stations are selected from the SEAMAP randomized sampling grid. At least 16 trawl stations are selected by LDWF for each survey. Additional stations are added as feasible. Species are identified, counted, measured, weighed and recorded; these data are submitted to the SEAMAP data management system, and near-real time data are transmitted to NMFS as required. In 2018, 20 shrimp/groundfish stations were sampled by LDWF personnel. Depths ranged from 5 to 100 meters (latitudes 28.4° to 29.1° and longitudes -89.4° to -92.0°). Plankton stations were not included in the summer survey this year. LDWF did not participate in the fall shrimp/groundfish survey due to weather restrictions.

SEAMAP Icthyoplankton Survey

SEAMAP Icthyoplankton Surveys are conducted biannually to provide information on the occurrence, abundance and geographical distribution of the eggs and larvae of spring spawning fish, particularly Atlantic bluefin tuna, and of fall spawning fish, particularly king and Spanish mackerel. LDWF only participates in the fall icthyoplankton survey and stations are selected from the NMFS icthyoplankton grids. Sampling is conducted using 60-cm bongo nets and 1x2m neuston nets. Samples are field processed, preserved and transferred to the NMFS Pascagoula Laboratory for transshipment to the Polish Sorting and Identification Center. During 2018, eight stations were sampled during the fall survey (between the latitudes 28°30.02 and 29°57.57, longitudes -89°33.59 and 91°29.97).

SEAMAP Vertical Line Survey

The SEAMAP Vertical Line Survey is conducted from April to September to collect information on the spatial and temporal distribution of commercial and recreational reef species off the Louisiana coast using commercial vertical line (bandit) gear. Sampling stations are drawn from a pre-established station universe provided by GSMFC with predetermined depth ranges and structure types, ranging in depth from 60 to 360 feet. The sampling encompassed sites form the South Pass of the Mississippi River to the Texas/Louisiana border (-89.00°- -94.00°). The data collected for each fish include the size of the hook on which it was caught, total length, total weight and sex. Otoliths of selected reef species are removed and processed. In 2018, 95 vertical line stations were sampled, landing 408 fish, of which 321 were red snapper (79 percent).

SEAMAP Bottom Longline Survey

The SEAMAP Bottom Longline Survey collects information on the abundance and distribution of elasmobranchs and bottom feeding species with standard 1 nautical mile longline sets. Stations are generated by GSMFC, in which bottom longline stations are proportionally allocated by longitude and depth based on the width of the continental shelf within depths of 10 meters. The annual stations are divided with the intent of sampling the entire Louisiana coast once per season (spring, summer, fall) during the months of April through September. All species are recorded, counted and measured for length(s), weight and sex (sharks). Sharks selected for tagging are tagged with dart or metal tag prior to their release to collect biological and life history information. Otoliths of selected reef species are removed and processed. In 2018, LDWF completed 96 longline sets in Louisiana's territorial waters. Longline efforts resulted in 2,367 captures. Elasmobranchs composed 52.5 percent of the catch, teleosts composed 46.9 percent, Echinoderms 0.05 percent and unidentified fish account for the remaining 0.55 percent. The most frequently captured shark was the blacktip shark, comprising 47.3 percent of the total shark captures, followed by the Atlantic sharpnose shark (33.4 percent), and the bull shark (9.5 percent). The most frequently captured teleost was the gafftopsail catfish, comprising 77 percent of the teleost captures, followed by the red drum (19.2 percent). Six-hundred and six sharks were tagged with metal tags.

Fisheries Research Projects

Spotted Sea Trout Life History Study

Previous assessment analyses (Assessment of spotted seatrout in Louisiana waters: 2011 Report by Joe West, Jason Adriance, Melissa Monk and Joseph Powers) provided estimates of female spawning potential ratio and spawning stock biomass based on limited data sets. New information has allowed for greater data resolution, which allows for more accurate estimates within the assessment model. Production estimates of the spawning stock are important inputs into the stock assessment model. Reproductive histological analysis has been completed on 209 seatrout ovaries from the 2015 spawning season and 334 females have been collected through June of the 2016 spawning season for future analysis. All of these fish have been aged and 11 batch fecundity estimates have been calculated thus far. In FY 2017-2018, 73 females and 19 males were collected through June of the 2017 spawning season. Female ovary tissue has been processed. By supplementing collections with charter catches we have increased the total number of older individuals which will aid in providing a better estimates of age-specific fecundity. The calculation of annual fecundity within age will allow for a more accurate representation of the spawning stock as a production input into the model and will more accurately assess the status of the Louisiana spotted seatrout spawning potential ratio. Future collections will focus on older spotted seatrout (ages 3+), obtaining

ABOVE: *Taking advantage of recent design changes to the SEAMAP bottom longline survey, LDWF began monitoring age structure of offshore red drum in 2018.* ***BELOW:*** *LDWF participates in the SEAMAP bottom longline survey based from the Grand Isle - Fisheries Research Lab but operated statewide. The goal of the survey is to characterize open-bottom catch. In nearshore offshore waters, that catch is dominated by shark species like this juvenile tiger shark.*

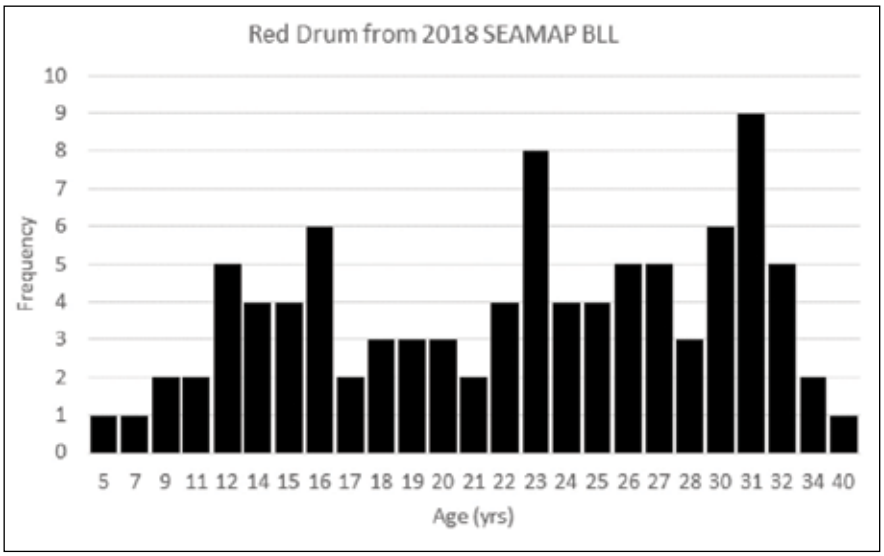


FIGURE 9.

females in spawning condition, and expanding the study from its current Barataria Basin focus to a statewide project that incorporates monthly samples from through the spawning season from each Coastal Study Area.

Offshore Red Drum Age Structure

The red drum (*Sciaenops ocellatus*) is one of the most harvested marine recreational fishes, both across the northern Gulf of Mexico and specifically in Louisiana (NMFS 2017). However, before 1988 red drum were overfished and undergoing overfishing. According to a red drum stock assessment conducted by the Southeast Fisheries Science Center in 1987, the chance of juvenile escapement to the spawning stock was less than 2 percent (Goodyear 1987). The Gulf of Mexico Fisheries Management Council implemented regulations that prohibited the retention of red drum from the Exclusive Economic Zone (EEZ; Red Drum Fishery of the Gulf of Mexico 1988). While the moratorium on EEZ harvest, which is still in effect, has increased spawning stock biomass in the Atlantic, the status of the Gulf of Mexico stock is unclear (SEDAR 2015, Porch 2000). Trammel net data from LDWF indicates an upward trend in mean size through sampling years, but it is difficult to determine whether this is the result of estuaries becoming more open water habitat or a recovering drum population. In addition, the closure of the offshore commercial purse seine fishery has limited biological sampling of older or larger red drum for otolith or gonad sampling to determine age composition or fecundity. The 2000 red drum stock assessment lists age composition of the adult population as a research priority for the Gulf of Mexico while both the 2000 Gulf of Mexico and 2015 Atlantic stock assessments are still using fecundity estimates from 1986-1992 (Wilson and Nieland 1994, Porch 2000, SEDAR 2015). There is a clear need for biological samples from the offshore red drum stock to inform future assessment attempts.

The portion of the SEAMAP bottom longline survey conducted by LDWF could provide a solution to red drum stock assessment needs. The SEAMAP bottom longline survey was redesign was instituted for the 2015 sampling season and resulted in greater sampling effort along the entire Louisiana coast inside the 10m contour. This survey has caught at least 100 red drum per year from 2015 through 2017 in offshore coastal waters adjacent to the Louisiana coast, with over 20 percent of the 90 stations recording of red drum catches. The lack of a consistent biological sampling source for offshore red drum has hindered stock assessment, but the LDWF portion of the SEAMAP bottom longline survey could provide a fishery independent source of otolith and gonad samples. Otoliths would provide abundance of age or year classes within the population while gonad samples would deliver spawning frequency and fecundity estimates. The abundance indices from standardized sampling coupled with age and reproductive analysis from the otolith and gonad samples would more accurately assess the adult population of red drum off Louisiana.

In 2018 LDWF collected otoliths from 160 red drum during offshore randomized bottom longline sampling. Though the majority of those landings occurred outside of the spawning season during spring sampling, 29 gonads were collected from female red drum closer to the spawning season during summer and fall bottom longline sampling. Ages for red drum collected offshore ranged from 5 to 40 years old (*Figure 9*). We expect that these data will be critical in characterizing the offshore spawning stock of red drum off the Louisiana coast in future stock assessments.

Southern Flounder Tag Retention

In an effort to assess perceived declines in southern flounder stocks, LDWF began to explore a pilot field tagging study in Barataria estuary where a large number of southern flounder could be captured using fishery-independent survey methods, tagged and released. Fishery recaptures could then be monitored through time and space to pro-

Lab biologists began a southern flounder tag and recapture pilot study in the fall of 2018, focused on flounder from the Barataria Basin.

vide information on mortality rates, population size, and movement. Gear tests for this potential survey are currently in progress.

Before the Barataria estuary field tagging study begins, a tank-study was needed to determine the optimal tag-type (T-bar or dart) and tag-location (dorsal fin or caudal peduncle region) for the southern flounder field experiment. To conduct this test, biologists at the Grand Isle Fisheries Research Lab collected 44 southern flounder using drop rings at night. Following a quarantine procedure, these flounder were alternately double-tagged with t-bar and dart tags and separated in equal numbers into four tanks where they were kept for up to six months. While final results of the tag comparison study are still being assessed, retention of t-bar tags was superior to dart tags and these results will help guide the planning of the potential field tagging study.

Offshore Artificial Reef Monitoring

The Artificial Reef Monitoring Grant Program has three main goals:

1. Analysis of GoPro video from previous (2015-17) and current vertical line (2018) surveys
2. Conduct vertical line surveys on LDWF artificial reef structures to enhance SEAMAP survey coverage of these structure
3. Develop and conduct roving diver surveys on LDWF artificial reef structures

While these surveys are all ongoing, progress can be reported toward the objectives of each.

During the reporting period, 430 unique GoPro videos were compiled from previous SEAMAP vertical line surveys (2015-2017). These videos were filtered for visibility and pre-read to define video read time bounds, with 43 of 247 videos readable from 2015, 37 of 97 videos readable from 2016, and 18 of 86 videos readable from 2017. Of the total collected, 98 videos were determined to be readable and these were read by two independent readers for finfish species identification on a 'min count' basis. Concurrently, GoPro videos were collected (SEAMAP funding for field work) from 2018 vertical line survey sites. While the 2018 survey is still in progress, over 300 videos have been collected to date. Following the completion of the current field season, the same readability criteria will be applied to videos that will then be read, after which video catch will be compared to vertical line survey catch with final results expected in 2019.

LDWF also sought to enhance the monitoring of LDWF artificial reef sites using the established SEAMAP vertical longline survey protocol. Ten percent of the artificial reef structures in the LDWF Offshore Artificial Reef Program were randomly selected and added to the 2018 survey. While the survey is still in progress, vertical line surveys have been conducted at 37 of the 46 artificial reef sites following the SEAMAP vertical line protocol.

In addition, LDWF sought to include a roving diver survey component to the LDWF artificial reef monitoring effort. While LDWF has previously conducted dive surveys at standing platforms, no dive surveys had been conducted at artificial reef sites until this year when a roving diver survey was successfully completed at the artificial reef site VR-66 (base). Biologists surveyed finfish species at the artificial reef site and the nearest standing platform. Artificial reef survey divers are planned for the remaining three zones of the survey and should be conducted before the end of the calendar year.

Offshore Invasive Species Monitoring

LDWF conducted roving diver surveys at offshore structures to document the presence, abundance, and habitat preferences of the invasive lionfish (*Pterois sp.*). Survey zones were the areas east of the Mississippi River Delta (Delta East), the area west of the Mississippi River Delta to Port Fourchon (Delta), Fourchon to Marsh Island (central Louisiana), and Marsh Island to the western Louisiana state line (west Louisiana). No dive surveys were conducted in 2017 due to conflicts with other projects and tropical weather. LDWF biologists have conducted seven survey dives to date in 2018, five of which were in the Delta West and two in the west Louisiana zones. Lionfish were observed at all three platforms in the ST-131 lease block but not at ST-152 or the ST-130 reef. Video, counts and habitat descriptions were recorded. Twenty-four lionfish were collected on the west Louisiana surveys and tissue, otoliths and stomachs were retained for species identification, age analysis and stomach content identification, respectively.

Future work on this project includes survey dives in both the Central and Delta East zones. In addition, dive video reads will produce consensus counts (min count) and species asso-

***LEFT:** Biologists removed earbones, stomachs and tissue samples from invasive lion fish sampled during an offshore survey.*
***RIGHT:** Biologists examined the gut contents from invasive lionfish sampled on offshore artificial reefs and standing oil platforms.*

ciations of lionfish sighted during the survey. Samples collected from lionfish will be processed and read, resulting in ages and characterization of lionfish diet on artificial structures in the north central Gulf of Mexico. In addition, DNA samples were taken from all lionfish sampled. Previous work suggests that the red lionfish (*Pterois volitans*) is dominant in the Gulf of Mexico, but that other cryptic lionfish species may co-occur. DNA samples can be sequenced in the future to confirm species identification.

Capture Mortality and Post-Release Survival of Blacktip Sharks in the Gulf of Mexico Fishery

Working in collaboration with scientists from Texas A&M Galveston, the University of Southern Mississippi and Florida International University, LDWF was awarded federal funding from the NOAA Saltonstall-Kennedy Program to investigate the survival of blacktip sharks caught on recreational gear and how that survival rate might impact the stock assessment. LDWF biologists and collaborators took blood samples from blacktip sharks to help evaluate capture and release In three regions: Texas, Louisiana and Florida. In addition, blacktip sharks were fitted with satellite tags to document survival and movement. During the 2016 and 2017, 56 blood samples were taken and 14 pop-up satellite tags deployed on blacktip sharks off the coast of Louisiana. Overall, 70 blood samples were taken and 36 satellite tags deployed in both years and all regions. This work is important because there is currently no estimate available for the survival of blacktip sharks when released from recreational gear. The current stock assessment is based on a rate calculated from a different species, the Atlantic sharp-nose shark, which is generally believed to have a lower release survival rate than blacktips. Since the blacktip shark is an important commercial and recreational species along the Gulf Coast, we expect this study to produce data immediately relevant to management of this species. Results from this study have been communicated to both the public and federal managers via oral presentations and the project final report and two publications from the blood chemistry and movement data are currently in progress.

Life History and Population Structure of Snowy and Warsaw Grouper in United States Waters

Snowy and Warsaw groupers are both valuable and vulnerable components of the deep-water grouper assemblage in the norther Gulf of Mexico. LDWF participated in a NOAA Marine Fisheries Initiative Program funded research grant with Texas A&M - Galveston, Texas A&M - Corpus Christi and the University of Florida to use tissue, hard parts and reproductive samples to address existing data gaps for these commercial and recreationally important species that are both either overfished (snowy) or experiencing overfishing (Warsaw), according to NMFS (SEDAR 4 and 36). By using both archived samples and active collection, the participant in this study were able to collect one of the largest samples ever collected for these two deep-water species, which are often difficult to sample. Collections are complete for this project and data analysis is currently under way, with the expectation that the results of the study will be of immediate utility to the federal managers of these fisheries.

As part of a collaborative study with university scientists, LDWF collected deep water grouper like this large Warsaw grouper, to better characterize age structure and life history of snowy and Warsaw grouper in the Gulf of Mexico.

Age and Growth of Yellowfin Tuna from the Northern Gulf of Mexico

As part of a yellowfin tuna research initiative that began in 2012, LDWF biologists collect ear bones (otoliths) from yellowfin tuna catches in Louisiana, with 2,201 otolith sets collected to date. Yellowfin tuna in the Atlantic are managed by the International Commission for the Conservation of Atlantic Tunas, which assesses this stock every five years. During the previous assessment (2011), the need for better and age-specific ageing data was noted. Working with experts from Texas A&M - Galveston's Pelagic Fisheries Conservation Lab, LDWF biologists were able to develop a new methodology for ageing yellowfin tuna and generate an updated growth curve for yellowfin from the Gulf of Mexico. LDWF biologists are now working with federal scientists to combine collections from both United States recreational and commercial fisheries to generate an updated consolidated growth model. In addition, the ageing techniques developed at LDWF for yellowfin tuna were used to train fisheries lab in other countries to build capacity in developing nations to keep up with the need for accurate fisheries data for this recreationally and commercially import stock that is managed on an Atlantic-wide basis.

Age and Growth of Wahoo from the Louisiana Recreational Fishery

Previous work in the Atlantic has defined the age and growth relationship for wahoo, but no work has been completed in the Gulf of Mexico. LDWF has obtained ovaries and otoliths with lengths from wahoo as they are seasonally encountered during routine dock sampling at offshore recreational angling ports. Ages have been assigned for 97 female, 30 male and three unknown (a total of 130) wahoo from the Louisiana coast. Fork length (cm) of aged individuals ranged from 86-176 cm for females with a mean (±SE) of 136.7(±16.53) cm and 91-154 cm for males with a mean (±SE) of 133.3(±17.41) cm. Ages ranged from 0.64-4.69 years for females with a mean (±SE) of 2.25(±0.10) years and 0.55-3.61 years for males with a mean (±SE) of 2.19(±0.15) years. All wahoo were sampled

from the charter boat or recreational private boat fishery. Although some of the 28 ovaries collected within the spawning season indicate the occurrence of spawns in the short term, none of the ovaries were ripe, which does not allow for estimates of fecundity.

Publications

Kitchens LL, JR Rooker, L Reynal, BJ Falterman, E Saillant, and H Murua. Discriminating among yellowfin tuna *Thunnus albacares* nursery areas in the Atlantic Ocean using otolith microchemistry. Marine Ecology Progress Series, Vol. 603: 201-213, 2018.

Lang ET and BJ Falterman. A comparison of sampling methods and a continuation of red snapper life history metrics. SEDAR 52 WP-07.

Lang ET and BJ Falterman. A continuation of results in the spatial distribution and occurrence of red snapper, *Lujanus campechanus*, sampled off the Louisiana coast during nearshore trawl sampling efforts. SEDAR 52 WP-08.

Wells RJD, TC Tinhan, MA Dance, JM Drymon, BJ Falterman, MJ Ajemian, GW Stunz, JA Mohan, ER Hoffmayer, WB Driggers, and JA McKinney. Movement, Behavior, and Habitat Use of a Marine Apex Predator, the Scalloped Hammerhead. Front. Mar. Sci., 10 September 2018 | *https://doi.org/10.3389/fmars.2018.00321*

Wells RJD, AN Evans, JM Hendon, K Boswell, BJ Falterman. Capture mortality and post-release survival of blacktip sharks (*Carcharhinus limbatus*) in the Gulf of Mexico recreational fishery. Final Report, NOAA Saltonstall-Kennedy Program Award Number: NA17N-MF4270224

Presentations

Falterman BJ and JA McKinney. An overview of a comprehensive yellowfin tuna (*Thunnus albacares*) research program in the northern Gulf of Mexico. LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

Falterman, BJ. An overview of a comprehensive yellowfin tuna (*Thunnus albacares*) research program in the northern Gulf of Mexico. ICCAT-AOTTP Program Management Meeting, Dakar, Senegal, 2018.

Lang ET, CA Levron, P O'Malley, and BJ Falterman. Annual Fecundity at Age of Spotted Seatrout (*C. nebulosus*). Maturity Assessment and Reproductive Variability of Life Stages (MARVLS) Workshop, Panama City FL, April 4-5, 2018.

Lang ET, CA Levron, P O'Malley, and BJ Falterman. Annual Fecundity at Age of Spotted Seatrout (*C. nebulosus*). Annual Meeting of the Louisiana Chapter of the American Fisheries Society, Baton Rouge LA, May 23-24, 2018.

Lang ET, CA Levron, P O'Malley, and BJ Falterman. Annual Fecundity at Age of Spotted Seatrout (*C. nebulosus*). LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

Lang ET, BJ Falterman, LL Kitchens, and CD Marshall. Age and growth of yellowfin tuna (*Thunnus albacares*) in the northern Gulf of Mexico. LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

Lang, ET and BJ Falterman. A Comparison of sampling methods and continuation of red snapper life history metrics. Maturity Assessment and Reproductive Variability of Life Stages (MARVLS) Workshop, Panama City FL, April 4-5, 2018.

Lang, ET and BJ Falterman. A Comparison of sampling methods and continuation of red snapper life history metrics. LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

Mohan JA, JM Hendon, E Jones, BJ Falterman, K Boswell, and RJD Wells. 2018. Resident and migratory behavior of blacktip sharks revealed through natural tracers and electronic tags. Gulf Estuarine Research Society Meeting. Galveston, Texas.

Mohan JA, JM Hendon, E Jones, BJ Falterman, K Boswell, and RJD Wells. 2018. Survival after trauma? Linking capture stress to post-release mortality of blacktip sharks in the Gulf of Mexico recreational fishery. American Fisheries Society, Atlantic City, New Jersey.

Mohan JA, JM Hendon, E Jones, BJ Falterman, K Boswell, and RJD Wells. 2017. Capture stress and post-release survival of Blacktip Sharks (*Carcharhinus limbatus*) in the Gulf of Mexico recreational fishery. Texas Chapter of the American Fisheries Society, Corpus Christi, Texas.

Olson, E, J Atilano, P Banks. Hatchery produced spat on shell pilot project: development of setting, deploying, and sampling techniques, and survival and growth results. LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

Wells, RLD, JM Drymon, BJ Falterman, GW Stunz, MJ Ajemian, T Tinhan, JA Mohan, ER Hoffmayer, WB Drigers III, JA McKinney. Movement and Oceanographic Preferences of Scalloped Hammerheads (*Sphyrna lewini*) in the Gulf of Mexico. 69th Conference of the Gulf and Caribbean Fisheries Institute, Grand Cayman, Cayman Islands.

Wooley, S, L Bourassa, E Olson. Performance of microalgae strains *Tisochrysus lutea* and *Chaetoceros muelleri* under LED conditions. LDWF Research and Management Symposium, Baton Rouge LA, June 4, 2018.

AGE & GROWTH LABORATORY

The collection of age, growth and reproductive information used to develop age-structured stock assessments is coordinated through the LDWF Age and Growth Laboratory in Baton Rouge. The Age and Growth Lab monitors 17 species of fish. Monitoring is done through the collection of otoliths and spines (gray triggerfish) for ageing purposes. Coastal Study Area biologists record length, weight, gender and location when fish are collected in the field. The 17 fish species consist of 13 saltwater and four freshwater species. The freshwater species are black crappie, white crappie, largemouth bass and channel catfish. The saltwater species are black drum, cobia, gray snapper, greater amberjack, gray triggerfish (spines), king mackerel, red drum, red snapper, sheepshead, southern flounder, spotted seatrout, striped mullet and vermilion snapper. Yellowfin tuna and wahoo are sampled by Fisheries Research biologists and considered fishery research species. Since 2015, LDWF Fisheries Research staff have been Gulf of Mexico-wide leaders in yellowfin tuna processing protocol and aging. Opportunistic samples of wahoo have led to age and growth model estimations and a maturity ogive. All saltwater otoliths/spines are obtained through fisheries dependent sampling. Dependent sampling requires field marine biologists to collect the otolith or spine when they interview a recreational angler, and also includes interviewing commercial fishermen at commercial fishing docks. Freshwater otoliths are obtained through independent sampling, requiring Inland field biologists to target a particular species. The lab usually receives otoliths (and spines) throughout each month of the year.

During FY 2017-2018, the Age and Growth Lab in Baton Rouge received 14,882 otoliths, of which 14,313 have been aged. Within that total, 3,067 of those otoliths were freshwater,

of which 3,022 have been aged. Spotted seatrout was the most collected species out of any marine or inland species because quotas for spotted seatrout are the highest and it is very popular among anglers. The totals for each species are:

SPECIES	COLLECTED	AGED
Black Crappie	433	432
Black Drum	1,441	1,436
Channel Catfish	576	558
Gray Snapper	136	131
Gray Triggerfish	2	2
Greater Amberjack	22	22
King Mackerel	6	6
Lane Snapper	1	0
Largemouth Bass	1,760	1,747
Red Drum	2,482	2,466
Red Snapper	1,817	1,811
Sheepshead	970	962
Southern Flounder	412	407
Spanish Mackerel	1	0
Spotted Seatrout	3,566	3,288
Striped Mullet	525	521
Vermilion Snapper	48	48
White Crappie	266	266

Otoliths were also collected from the two research species, wahoo and yellowfin tuna. The Fisheries Research and Assessment section spearheads the sampling and processing of these species. The total for those species are:

SPECIES	COLLECTED	AGED
Yellowfin Tuna	355	190
Wahoo	3	3

The season for striped mullet and black and white crappie collection is typically during the fall. Largemouth bass sampling is mostly done during the spring and early summer months.

Otolith sampling quotas were adjusted in early 2018 from the previous year. The number of marine otoliths has slightly increased compared to last year's numbers. All otoliths received during this time period have been processed, meaning they were cataloged, prepared to be sectioned, first and second read.

During FY 2017-2018, the Age and Growth Lab received the reference set for black drum, gray snapper, gray triggerfish, red drum, red snapper, sheepshead and vermilion snapper. The annual GSMFC Otolith Processor's Workshop in May is held in Panama City, Florida, and hosted by GSMFC. The reference sets are used to help sharpen Age and Growth biologists' otolith ageing skills. The sets are also used to ensure all labs base their ages on the correct criteria.

INLAND RESEARCH

Many issues that Inland Fisheries biologists face require laboratory and field research to validate current techniques, investigate new methods of resource management and prioritize management actions across Louisiana's freshwater ecosystem.

Freshwater Artificial Reef Program

LDWF facilitates this program by partnering with sponsor groups to construct artificial reef projects in Inland waterbodies. LDWF's role in this program is that of administrator and/or consultant. As such, LDWF makes final decisions relative to project design, material selection and placement for all projects sanctioned by LDWF. The U.S. Coast Guard is consulted if artificial structures are proposed to be placed in navigable waterways. LDWF's Inland Fisheries biologist managers serve as points of contact for proposed projects and must grant prior approval for proposed projects to ensure compliance with project guidelines. Once implemented, LDWF Inland Fisheries biologists monitor the reef via diving, snorkeling or underwater photography to evaluate usage by target species. Biologists also compare pre- and post-installment creel data to evaluate the influence on angler perception and success. LDWF biologists are also conducting research on the use of artificial reef structures in Booker Fowler Fish Hatchery to try and reduce mortality on Florida strain largemouth bass brood stock from avian predators. Two reef structure designs were built, one with shade and one without shade, to evaluate how the two different structure types provide cover from avian predators and provide thermal refuge that increases growth. Although this experiment did not show significant positive results, there were several environmental factors that could have influenced the outcome. Also, it is possible that a higher percentage of reef cover may be necessary to result in changes in total natural mortality and avian mortality. The impact of additional structures may be investigated in future trials.

Florida Largemouth Bass Genetics

LDWF Inland Fisheries has worked closely with LSU AgCenter to determine the genetic composition of selected largemouth bass populations in the state. The data is used to manage hatchery stocks, assess the relative mortality of native, Florida and hybrid largemouth bass, and assess the introgression of Florida largemouth bass genes into Louisiana largemouth bass populations resulting from continuing stocking efforts by LDWF. During FY 2017-2018, 1,422 largemouth bass were tested for sub-species identification. These fish were from Lake Bistineau, Bundick Lake, Lacassine National Wildlife Refuge, the Lake Verret/Grassy Lake/Lake Palourde omplex, Grand Bayou Reservoir, Old River, the Spring Bayou Complex, the Larto-Saline Complex, Turkey Creek Lake, and Cane River Lake (*Table 6*).

American Eel Age and Growth

American eels have been studied very little along the coast of the Gulf of Mexico, which has lead our Inland Fisheries biologists to research the life history of eels found in Louisiana. Inland Fisheries District 5 has been working on a State Wildlife Grant for American eel life history information since November 2017. To date, they have processed 118 eels that were collected throughout the state by various methods. The parameters collected include length, weight, stomach contents, sex determination, presence of swim bladder parasites and removal of otoliths and tissue for DNA. Aging otoliths has provided the ages for 117 specimens, with the oldest eel being 16 years. Staff has found three specimens from one site that contained swim bladder parasites. These have been submitted for DNA verification. This project has one year remaining, and will provide the department with much needed information on American eels for future management considerations.

Marginal Increment Analysis on Channel Catfish Otoliths

Past catfish stock assessments in Louisiana have relied on pectoral spines as the primary aging structure. A comparison of spines vs. otoliths was performed by the LDWF Age and Growth Lab in 2015, to determine the preferred ageing structure. Otoliths were identified as the structure of choice. In order to assign accurate age and margin information to each otolith, biologists began to collect ear bone structures to obtain a reference set, as well as to perform a marginal increment analysis. In March 2016, biologists began to collect otoliths from 25-50 channel catfish monthly from the Lake Verret, Grassy Lake and Lake Palourde areas located in south-central Louisiana. This lake system is an open cypress-tupelo swamp, and is a prime area for recreational and commercial catfish harvest. During FY 2017-2018, 230 otolith pairs were collected for analysis of which 213 have been aged. Otoliths collection ended in 2018, at which time the marginal increment analysis will be completed and a stock assessment will be performed.

TABLE 6. Largemouth bass tested for sub-species identification in FY 2017-2018.

LOCATION	NUMBER				PERCENT			DATE SAMPLED	DISTRICT
	NORTHERN	HYBRID	FLORIDA	TOTAL	NORTHERN	HYBRID	FLORIDA		
Bistineau	178	30	4	212	83.90%	14.20%	1.90%	February 2017	1
Turkey Creek	93	10	5	108	86.10%	9.30%	4.60%	Oct./Nov. 2017	2
Turkey Creek	54	8	1	63	85.70%	12.70%	1.60%	Fall 2016	2
Larto	124	10	2	136	91.20%	7.40%	1.50%	Sept. 2017	3
Bundick	68	14	7	89	76.40%	15.70%	7.90%	April 2017	5
Lacassine Pool	25	35	87	147	17.00%	23.80%	59.20%	March 2017	5
Spring Bayou	133	24	3	160	83.10%	15.00%	1.90%	October 2017	6
Verret-Grassy-Palourde	122	12	1	135	90.40%	8.90%	0.70%	March 2017	7
Old River	140	0	0	140	100.00%	0.00%	0.00%	October 2017	7
Grand Bayou	66	44	28	138	47.80%	31.90%	20.30%	January 2017	10
Cane River	73	19	2	94	77.70%	20.20%	2.10%	March 2017	10
TOTAL				815					

Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana

LDWF Inland Fisheries biologists began to survey 34 sites in historical locations of the Frecklebelly Madtom in the Pearl River drainage of Louisiana, and sites adjacent to these areas, to assess presence/absence and relative abundance of the species. The data generated will provide thorough and much needed current distribution and abundance data to USFWS, allowing them to make a more informed decision regarding federal listing of *Noturus munitus* from the Pearl River drainage. It also will inform both state and federal managers responsible for planning and implementing long-term conservation and recovery for the species and its habitat to ensure that devised strategies are effective.

At-risk Freshwater Mussel Survey of Bogue Chitto National Wildlife Refuge

LDWF biologists began to conduct 50 qualitative samples of freshwater mussels on sites located within, and adjacent to, the boundaries of the Bogue Chitto National Wildlife Refuge in Louisiana. These surveys were distributed across sites within the Bogue Chitto River, Holmes Bayou, Wilson Slough, the West Pearl River and the Pearl River proper along with adjacent backwater sloughs and remnant river channels.

Hydrologic Alterations on Mississippi River Batture Lands

The batture habitat located on the Richard K. Yancey WMA provides a unique opportunity to investigate fish passage restoration in the form of enhanced connectivity between the mainstem of the Mississippi River and floodplain water bodies, while also providing enhanced boating and fishing opportunities on the floodplain. A partnership between federal and state entities aims to improve floodplain access for dependent aquatic species, and enhance natural flow regimes during the annual flood pulse by improving natural and man-made fish passage features throughout the Richard K. Yancey WMA property. Baseline water quality, community assemblage and abundance data have been collected in the project area where little to no historical information was available. Changes in fish community composition will be evaluated based on electrofishing and gill net samples post-alteration.

Presentations

Harlan, A. R., R. Moses, R. McGuffee, A. Perret, B. C. Reed and T. Vidrine. Hydrologic Alterations on Batture Lands. Louisiana Department of Wildlife and Fisheries Research and Management Symposium, June 4, 2018; Baton Rouge, Louisiana. (poster)

Kinney, S. D. Hill, K. Butler, and R. Maxwell. The Roles of Artificial Reefs in Hatcheries. Louisiana Chapter of The American Fisheries Society, May 24-25, 2018; Baton Rouge, LA

Advisory Group Membership

- Atchafalaya Basin Program Technical Advisory Group (chair)
- Lake Providence Watershed Council (chair)
- False River Watershed Council (chair)
- Louisiana Vegetation Managers Association (Past President)
- Southeast Association of Fish & Wildlife Agencies - state representative
- Mississippi Interstate Cooperative Resource Association - state representative
- Lower Mississippi River Conservation Committee - Executive Committee
- Mississippi Interstate Cooperative Resource Association - Paddlefish and Sturgeon Committee
- Catfish Management Technical Committee of the Southern Division of the American Fisheries Society
- Reservoir Committee of the Southern Division of the American Fisheries Society
- Warm Water Streams Committee of the Southern Division of the American Fisheries Society
- American Eel Subcommittee of the Warm Water Streams Committee of the Southern Division of the American Fisheries Society
- Pollution Committee of the Southern Division of the American Fisheries Society
- Gulf Coast Prairie Landscape Conservation Cooperative - Science Team
- Atchafalaya Basin Research and Promotion Board
- Mid-South Aquatic Plant Management Society (Board Member)
- Louisiana Fish Contaminants Advisory Group
- Toledo Bend Power Project Relicensing Project (FERC/SRA) - Aquatic Resources Working Group
- Pallid Sturgeon Recovery Team
- Lower Basin Pallid Sturgeon Workgroup
- Gulf Sturgeon Recovery Team
- Mississippi River Basin Panel on Aquatic Nuisance Species
- Gulf and South Atlantic Regional Panel of the Aquatic Nuisance Species Task Force
- Louisiana Aquatic Invasive Species Council
- Louisiana Aquatic Invasive Species Task Force

OTHER RESEARCH

ACOUSTIC TELEMETRY TAGGING

LDWF is leading a collaborative research project in Lake Pontchartrain to study the movements and habitat preferences of important fish species using acoustic telemetry technology. Fish are surgically implanted with acoustic transmitters, enabling tagged fish to be detected when swimming near receivers deployed throughout various habitats in the lake. The receiver array is used to cooperatively track red drum, spotted seatrout and bull sharks tagged by LDWF, spotted seatrout tagged by LSU, red drum and bull sharks tagged by UNO, and Gulf sturgeon tagged by USFWS and USACE.

During FY 2017-2018 no additional fish were acoustically tagged in Lake Pontchartrain. Data from the receiver array have been downloaded regularly throughout the fiscal year, filtered corresponding to tagging organization, and sent to our collaborating partners for analysis. In addition, data is uploaded onto a website developed in collaboration with the University of New Orleans Technology Group that allows the public to visualize the movements of acoustically tagged fish (*louisianafisheries.net/telemetry/*). Site visitors are able to sort fish by species, weight, size or sex and track their movements throughout Lake Pontchartrain. While fish are moving, the date, time, temperature, salinity, tide and lunar cycle are displayed, allowing visitors the opportunity to observe seasonal migrations, habitat preferences and response to environmental changes. Detailed analysis of acoustically tagged fish continued throughout FY 2017-2018, including a graduate student at LSU that is analyzing the spotted seatrout data. In addition, data has been shared with USFWS to assist with their Gulf sturgeon monitoring.

FISHING ACCESS AND OPPORTUNITY

Louisiana is nationally recognized by anglers and fisheries professionals as a premier sport fishing destination. The Office of Fisheries strives to create, enhance and restore our state's inventory of public boating and fishing access sites. Access sites, including marinas, boat launches and fishing piers, serve as doorways to our state's natural resources.

ACCESS

In a cooperative effort, LDWF provides financial assistance to local government entities through a competitive process to construct, improve and repair boating and fishing access facilities. Improvements and repairs are also made to boating and fishing access facilities owned by LDWF. This program is funded through the Sport Fish Restoration Program and includes both freshwater and saltwater projects. Projects may include the construction of boat ramps, parking areas, docks, bulk heading and fishing piers.

BOATING ACCESS PROJECTS COMPLETED

- **Slidell Municipal Marina, BIG-P, Tier II** - Project plans include upgrading an existing facility to include accommodations for boats greater than 26 feet.

BOATING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **West End-Breakwater Drive Boat Launch** - Project includes renovating the existing two-lane boat ramp and parking area.
- **Deer Park Boat Launch** - The Deer Park Boat Launch is owned and maintained by LDWF. Repairs include replacing sections of the concrete boat ramp, installing sheet piling and back fill to prevent future erosion and drainage improvements to the parking area.
- **City of New Iberia Boat Slips** - Project includes the construction of mooring facilities along Bayou Teche in downtown New Iberia to accommodate transient boaters.

FISHING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **St. Tammany Fishing Pier Phase II** - Project includes constructing amenities and additional wooden crossovers to connect the existing Phase I Twin Span fishing pier.
- **Burns Point Recreational Area Fishing Pier** - Project plans include construction of a fishing pier at the existing recreational area to provide fishing opportunities for visitors.
- **Port Sulphur Civic Drive Fishing Pier** - Project plans include construction of a fishing pier at the existing boat ramp and improvements to the parking area.
- **Bussey Brake Reservoir** - Bussey Brake Reservoir is owned and maintained by LDWF. Two boat lanes have been cleared to provide safe boating access in the reservoir. Additional project plans include installation of breakwater structures at the boat ramp, construction of a mooring dock, extension of two existing fishing piers, and the construction of two new fishing piers.
- **Indian Creek Recreation Area Fishing Pier** - This project includes the construction of a fishing pier at the Indian Creek Recreation Area to provide safe and accessible shoreline fishing opportunities.

CLEAN VESSEL ACT PROGRAM

- **Slidell Municipal Marina** - COMPLETED - Project plans include the installation of a pump out system at the renovated marina facility.
- **City of New Iberia CVA Sanitation Facility** - Project includes relocation of an existing pump out facility to the future site of a mooring facility in downtown New Iberia.

NUISANCE AQUATIC VEGETATION

Control of nuisance aquatic plant species is necessary to provide access to many public waterways. Aquatic vegetation management efforts are designed to ensure that the natural environment and human interests are mutually protected.

Our natural resources are constantly under attack from invasive species posing a threat to healthy habitats and access opportunities for the public. The flagship of these initiatives is our Aquatic Plant Control Program, which strives to provide the public with safe and usable fishing and boating access. Left unchecked, invasive plants have the potential to completely inundate the state's abundant freshwater lakes, making them inaccessible

and threatening the natural habitat of our valuable aquatic resources. Aggressive treatment of affected waters continued in FY 2017-2018 in an ongoing effort to restore and improve the aquatic habitat and the natural balance of plants and fish.

The Aquatic Vegetation Management Plan format was created for lakes that do not have an approved LDWF Waterbody Management Plan to provide a lake description, basic information, a listing of lake authorities, historical vegetation control information, current aquatic plant status, and recommendations for control. These documents are used as a guide for aquatic plant control and as a source of recommendations and information to provide to the lake authorities and the public. In FY 2017-2018, the Aquatic Plant Control Program completed 81 Vegetation Management Plans for Louisiana public waterbodies.

In FY 2017-2018, herbicides were applied to 52,735 acres of nuisance aquatic vegetation, and the majority of these efforts included control of 15,988 acres of water hyacinth, 26,705 acres of giant salvinia, 2,551 acres of alligator weed and 1,641 acres of common salvinia. In addition, approximately 314,996 adult giant salvinia weevils were stocked in water bodies throughout Louisiana.

Another method used for control of aquatic vegetation includes water level fluctuations. Natural water systems benefit from high spring-time water levels and lower water levels in the fall. Benefits include aquatic vegetation control and a healthier fish population. For impounded waters, partial dewaterings (typically called drawdowns) are often conducted to induce similar benefits. These drawdowns also provide the opportunity for improvements to shoreline properties. Drawdowns were conducted on 12 inland reservoirs in FY 2017-2018 (*Table 7*).

In recent years, aquatic plant control biologists have shifted efforts towards identifying and utilizing all effective plant control methods available. Integrated pest management involves combining the effects of chemical, mechanical and biological control methods to manage nuisance species more effectively and efficiently. The long-term benefits and cost efficiency provided by the integrated pest management strategy allows LDWF to more effectively manage the aquatic vegetation infestations throughout Louisiana's public waterbodies.

Maintaining Community Fishing Opportunities

Waters available and accessible to the public for recreation and fishing are often unavailable in big cities and urban areas. For this reason, those ponds and lakes that are available can experience increased use during the summer months. University Lake in Baton Rouge is no exception. The lake is both heavily fished and utilized by many local schools and organizations. During routine aquatic vegetation assessments, District 7 crew noticed infestations of water lettuce that had not been problematic in the recent past. During FY 2017-2018, a total of 7.5 acres of nuisance aquatic vegetation were treated in University Lake. Several applications were made throughout FY 2017-2018 to treat water lettuce with diquat at a rate of 1 gallon per acre with a nonionic surfactant at a rate of 0.25 gallons per acre. Results were excellent. LDWF personnel assesses the LSU lakes frequently and applications are made as necessary. The lakes were able to remain open and accessible to the public year-round.

TABLE 7. *Drawdowns conducted in FY 2017-2018*

LAKE NAME	PURPOSE OF DRAWDOWN	DATES
Vernon Lake	DOTD Initiated Dam and Spillway repairs due to Hurricane Harvey damage	2017 - 2019
False River	Sediment Consolidation/Bottom Oxidation	Sept. 5 - Oct. 22, 2017, drawdown postponed due to flooding
Bussey Brake	Lake Renovation	2013 - Until Project Completion
Cheniere Lake	Vegetation control; bottom oxidation; infrastructure and road repair	From July 2016 until repairs are completed - Approx. 18-24 months
Lake Martin	Aquatic Vegetation, Bottom Oxidation	Sept. 5, 2017 - Jan. 1, 2018
Cocodrie Lake	Aquatic Vegetation, Bottom Oxidation	Jan. 3 - Sept. 30, 2018
Iatt Lake	Aquatic Vegetation Management	May 15 - Dec. 14, 2017
Lake Claiborne	Shoreline Maintenance (scheduled every six years)	Sept. 7, 2017 - Jan. 15, 2018
Lake Bistineau	Giant salvinia control/fisheries improvements	May 1, 2017 - Jan. 26, 2018
Black and Clear Lake	Vegetation Management	July 3 - Dec. 5, 2017
Clear-Smithport Lake	Vegetation Management	July 21 - Dec. 4, 2017
Saline Lake	Vegetation Management and pipeline repair	June 1 - Oct. 2, 2017

Terrebonne Marsh Water Hyacinth Control

For many years, the USACE Removal of Aquatic Growth Program was responsible for water hyacinth control in the freshwater marshes located in the Terrebonne Basin. In 2010, the Removal of Aquatic Growth Program lost its funding, and its plant control efforts completely ceased by the end of the year. Since that time, LDWF has assumed the responsibility of maintaining boating access in this area. This vast coastal freshwater area fills with water hyacinths each year, and main bayous can be completely blocked by the vegetation if left untreated. These plants inevitably get deposited into the public bayous and canals by tidal action and changes in wind direction. When large rafts of water hyacinths form blockages in the canals, it impedes both recreational and commercial activities. In order for the Aquatic Plant Control Program to maintain open canals and bayous in the Terrebonne marsh, herbicide applications usually begin in April and continue into December. In FY 2017-2018, LDWF treated 4,119 acres of aquatic vegetation in the Terrebonne marsh. These concentrated efforts have been successful in providing both recreational and commercial use to the public throughout the year.

Evaluation of Giant Salvinia Control Methods

Since 2006, giant salvinia has spread to waters throughout much of Louisiana. As a result, identifying and implementing all efficient and effective control methods for this invasive aquatic weed has been a priority for the Aquatic Plant Control Program. Introduction and establishment of giant salvinia weevils, a species-specific biological control, has been a major focus of the program since that time. Most recently, salvinia weevil research has focused on finding a cold tolerant weevil in order to ensure overwintering in the northern part of the state. LDWF is currently collaborating with LSU on establishing a cold-

tolerant weevil rearing facility in central Louisiana. In recent years, LDWF has evaluated the effectiveness of several mechanical control devices including the WaterMower, bucket boats, mashers, harvesters and weed cutters. Unfortunately, mechanical control options are typically slower, more labor intensive and more expensive than LDWF's current giant salvinia control approach which includes herbicide applications, water level manipulation and weevil establishment. Although herbicide applications remain a major part of the salvinia control efforts, the Aquatic Plant Control Program continues to search for more effective and cost efficient chemicals available for use in aquatic systems. Since 2012, LDWF has worked closely with USACE and LSU AgCenter weed scientists to explore the effectiveness of new herbicides and to test the potential of mixtures of herbicides and the effects of different surfactants. This research includes controlled, replicated experiments, as well as field evaluations of mixtures that show potential for more cost-efficient control. Recent research results indicated that a specialized adjuvant containing both methylated vegetable oil and an organosilicone component is as effective as the mixture of two unique surfactants that was being used previously. Along with this discovery, it has been proven that either of the herbicides Clipper (flumioxazin) or Stingray (carfentrazone) can be used as an alternative to diquat dibromide to act as an indicator and to initiate plant damage when combined with glyphosate for salvinia control. Experiments continued throughout FY 2017-2018, focusing on the effectiveness of alternative herbicides both alone and in combination. These efforts will continue as new herbicides become available and could lead to more effective control of giant salvinia in the future.

Presentations

David, J. Five Consecutive Annual Drawdowns 2018-2022 to Control the Spread of Giant Salvinia. Evangeline Parish Police Jury Meeting. August 7, 2017. Alexandria, Louisiana

David, J. Five Consecutive Annual Drawdowns 2018-2022 to Control the Spread of Giant Salvinia. Rapides Parish Police Jury Meeting. August 7, 2017. Ville Platte, Louisiana

David, J. and B. Launey. Spring Bayou Integrated Approach to Control Aquatic Vegetation. Louisiana Department of Wildlife and Fisheries Research and Management Symposium. June 4, 2018. Baton Rouge, Louisiana. (poster)

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Louisiana Aquatic Vegetation Management Association, October 3-5, 2017. Pineville, LA.

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Louisiana Aquatic Vegetation Management Association, March 12-13, 2018. Baton Rouge, LA.

Sibley, J. K. Houston and J. Seales. Lake Bistineau: A Case Study of Managing Giant Salvinia (*Salvinia molesta*) in a Lowland Swamp Reservoir. Joint Arkansas and Louisiana Inland Fisheries Biologist Meeting, July 13, 2017; Homer, Louisiana

Sibley, J. K. Houston. LDWF Salvinia Weevil (*Cyrtobagous salviniae*) Introductions in Northwest Louisiana. Joint Arkansas and Louisiana Inland Fisheries Biologist Meeting, July 13, 2017; Homer, Louisiana. (Also given at the Bayou Chapter of the Ozark's Society Meeting in Shreveport Feb. 20, 2018)

FISHING OPPORTUNITY

Louisiana's fishery resources, including habitat, benefit all of Louisiana's constituent groups within the state and across the Gulf Coast. Habitat stewardship and resource management provide opportunities for the public to access these natural resources.

COMMUNITY FISHING PROGRAM

The "Get Out & Fish!" community fishing program was initiated in November 2014. The goal of the program is to work with local community organizations and governments to provide easily accessible, high-quality fishing opportunities to everyone in Louisiana. The program intends to recruit new anglers to the sport of fishing and promote outdoor activities for future generations. In order to accomplish this mission, public water bodies that met the required specifications were chosen by LDWF biologists to begin stocking fish on a regular basis.

Get Out and Fish! Sites

Three new community fishing locations were added in FY 2017-2018, including Southside Regional Park - Fabacher Field in Youngsville, Elmore D. Mayfield Park in Ruston and Sidney Hutchinson Park in Walker. With the addition of these three sites, there are 12 total locations in the Community Fishing Program. A total of 14,700 pounds of channel catfish and 7,100 pounds of rainbow trout were stocked in all of the community fishing sites during FY 2017-2018 (*Table 8*).

Additional Sites

LDWF biologists completed several site visits of potential locations to be added in FY 2018-2019 to the "Get Out & Fish!" program. Three additional sites are currently being considered to be added to the program in FY 2018-2019.

ARTIFICIAL REEFS

The Louisiana Artificial Reef Program was created by Act 100 of the 1986 Louisiana Legislature within LDWF. Act 100 also required the formation of the Artificial Reef Development Council, development of an Artificial Reef Plan, and establishment of the Artificial Reef Trust Fund.

The Artificial Reef Development Council is comprised of the Secretary of LDWF, the Dean of LSU's School of the Coast and the Environment, and the Executive Director of Louisiana Sea Grant, or their designees. The council is charged with providing guidance on policy, procedural matters, site selection and allocation of funds to the program. The Office of Fisheries administers and manages the program in accordance with the National Artificial Reef Plan, Louisiana Artificial Reef Development Plan, pertinent regulations, laws, and budget allocation.

The Louisiana Artificial Reef Plan was developed and implemented in November 1987. The plan outlines the siting, permitting and monitoring requirements. The plan centers on nine artificial reef planning areas and the conversion of oil and gas platforms into permanent marine hard-bottom habitat. The program also includes special artificial reef sites, deepwater reefs, nearshore reefs and inshore reefs. The program works closely with stakeholders, public and private conservation groups, and appropriate regulatory agencies when developing, maintaining and monitoring Louisiana's artificial reefs.

In FY 2017-2018, the program enhanced nine offshore reefs with seven oil and gas platforms and received $1.5 million in donations from oil company participation.

The Louisiana Artificial Reef Program has successfully created one new inshore reef site and enhanced one inshore reef site in FY 2017-2018. The new reef site is an 10-acre permit area named St John Reef, located in Lake Pontchartrain. The reef included the deployment of 4,000 tons of limestone, which was completed in June 2018. The Point Mast reef site is located 10 miles south east of Cocodrie and was enhanced using 1,200 tons of limestone.

TABLE 8. Stocking Totals for FY 2017-2018: Number of Fish in Pounds.

PARKS	TYPE OF FISH	OCT. 2017	NOV. 2017	DEC. 2017	FEB. 2018	APRIL 2018	MAY 2018	JUNE 2018
Purple Heart Memorial Park - Ragley	Rainbow Trout			600	600			
	Channel Catfish	800	600			600		200
Girard Park (Lafayette, La.)	Rainbow Trout			600	400			
	Channel Catfish	300	600					400
Zemurray Park (Hammond, La.)	Rainbow Trout			400	400			
	Channel Catfish	300	300					300
BREC's Burbank Park (Baton Rouge, La.)	Rainbow Trout			800				
	Channel Catfish	800	800					300
Kiroli Park (West Monroe, La.)	Rainbow Trout			800	500			
	Channel Catfish	500	200			500		200
William T. Polk Park (Vidalia, La.)	Rainbow Trout			400	400			
	Channel Catfish	600	600			600		200
Turner's Pond (Minden, La.)	Rainbow Trout			800				
	Channel Catfish	1000	200			1000		
Grambling City Park (Grambling, La.)	Rainbow Trout			200	200			
	Channel Catfish		600			200		
Southside Regional Park - Fabacher Field (Youngsville, La.)	Channel Catfish					600		200
Elmore D. Mayfield Park (Ruston, La.)	Channel Catfish						1000	200
TOTALS	Rainbow Trout			4600	2500			
	Channel Catfish	4300	3900			3500	1000	2000

The site was originally constructed in November 2009 when 4,300 tons of limestone were deployed in the 50-acre permit area.

During the FY 2017-2018, the artificial reef research and assessment team continued their efforts to build a baseline fish and invertebrate assemblage dataset for LDWF's inshore, nearshore and offshore artificial reefs. For both inshore and nearshore artificial reefs, these efforts included the continuation of the standardized use of unbaited fish traps soaked for 24-hours, the deployment of benthic trays and the collection of environmental DNA water samples. Fish traps were deployed at the West End, St. Tammany Pier, South & North Twin Span, St. John, Lake Front, Laketown, Point Mast, Independence Island, California Point, East Calcasieu, and The Pickets artificial reef sites. Both the St. John and Point Mast artificial reef sites were sampled before and after deployment/enhancement activities. Environmental DNA water samples were collected over inshore and nearshore artificial reef sites slated for future enhancement, which included California Point, Independence Island, Grand Isle 9, Point Mast, Bird Island, The Pickets, Cypremort Point II, Rabbit Island Reef, and East Calcasieu. Benthic trays were deployed at the St. John, California Point, Independence Island, and East Calcasieu artificial reef sites. Offshore artificial reef monitoring efforts included the completion of fish identifications and counts from all video collected during a spring 2017 remotely operated vehicle survey in which video data of organisms were collected using three different flying methodologies. Lastly, deployment monitoring of both the St. John and Point Mast artificial reefs was conducted in FY 2017-2018 to ensure compliance with federal regulations.

The locations of all of Louisiana's artificial reefs can be found on the LDWF website, including an Interactive GIS-based map (*ldwf.maps.arcgis.com/apps/MapSeries/index.html?appid=4c4a4d9526c248c080c3eaa4808b9bea*).

Important Figures for FY 2017-2018

- 76 total established offshore artificial reef sites
  - 48 planning area reefs
  - 18 special artificial reef sites
  - 10 deepwater reefs
- Offshore structures converted to permanent habitat
  - 401 platform jackets
  - 8 drill rig legs
  - 12 oil and gas structures deployed
- 6 established nearshore reefs
- 29 inshore reefs sites

FRESHWATER ARTIFICIAL REEF PROGRAM

Freshwater artificial reefs can be utilized to accomplish multiple Inland Fisheries objectives, but the primary objective for this program is to increase angler success. For many anglers, finding fish in a water body, especially one that is new to them, is a major obstacle to a successful fishing trip. Artificial reefs concentrate fish, and identifying the structures on maps and with buoys makes them available to all anglers. A secondary objective is increased fisheries habitat. As lakes age, flooded timber decomposes and water bottoms may accumulate silt and organic debris. This progression can lead to a reduction in fisheries productivity. If sufficient artificial cover or substrate is added, fisheries productivity can be maintained.

LDWF facilitates this program by partnering with sponsor groups to construct artificial reef projects. LDWF's role in this program is that of an administrator and/or consultant. As such, the department makes final decisions relative to project design, material selection and placement for all approved projects. The U.S. Coast Guard is consulted if artificial structures are proposed to be placed in navigable waterways. LDWF's Inland Fisheries biologist managers serve as points of contact for proposed projects and must grant prior approval for proposed projects to ensure compliance with project guidelines.

Important Figures for FY 2017-2018

- 94 total established freshwater artificial reef sites
- 25 total new freshwater artificial reef sites since 2016

FRESHWATER FISH HATCHERY PROGRAM

The Louisiana Hatchery Program partners with local, state and federal agencies to produce and stock freshwater fish to start or enhance statewide sport fisheries, to hasten the recovery of fisheries affected by natural or man-made disasters, and to produce threatened or endangered species, if necessary. Fish are requested annually by Inland Fisheries according to the department's "Resource Enhancement through Stocking" guidelines. The program also provides support services for LDWF's outreach, education, and aquatic plant control programs.

FISH STOCKING

This year, in cooperation with USFWS, the City of Shreveport's Cross Lake Fish Hatchery, LDWF's Rockefeller Wildlife Refuge, LDWF's Aquatic Plant Control Program, the Red River Waterway Commission, the Toledo Bend Lake Association, and the Lake Claiborne Association, over 8 million fish were released in 72 water bodies around the state. *Table 9* provides a comprehensive list of fish stocked in Louisiana waters during FY 2017-2018.

HATCHERY AND FISHERIES OUTREACH/EDUCATION

The hatchery program continued to provide support for departmental education and outreach programs. Support included providing fish and/or fish transportation for community fishing and outreach events, along with maintaining, transporting, setting up, stocking and manning LDWF's mobile aquarium at outreach events. LDWF also provided hatchery presentations and tours to groups and visitors by request. The hatchery program transported 3,150 pounds of catfish for USFS fishing derbies and 1,650 pounds of catfish for Fort Polk fishing derbies. Hatchery biologists assisted private pond owners with technical advice and pond water quality testing, and helped to coordinate and host the 2017 CENLA National Hunting and Fishing Day Event in Woodworth, Louisiana, which had an estimated attendance of 3,000 people.

INVESTIGATIONAL NEW ANIMAL DRUG PROGRAM PARTICIPATION

LDWF hatcheries continued to participate in the USFWS National Investigational New Animal Drug Program. This program provides "a means through which federal, state, tribal and private agencies or organizations located throughout the United States are 1.) allowed to use certain critical drugs necessary to maintain the health and fitness of aquatic species under Investigational New Animal Drug exemptions, and 2.) contribute important drug efficacy and safety data needed to support the future approval of new drugs for use in aquatic species."

PRESENTATIONS

Butler, K. The Louisiana Fish Hatchery Program: Who, What, Why, Where, & How?. . The Alexandria Lions Club Meeting, , August 30, 2017, Alexandria, LA.

Butler, K. The Louisiana Fish Hatchery Program: Who, What, Why, Where, & How? The LDWF Aquatic Volunteer Instructor Program Banquet Workshop. November 16, 2017, Slidell, LA.

Butler, K. The Louisiana Fish Hatchery Program: Who, What, Why, Where, & How? The Kisatchie Fly Fishers Monthly Meeting, June 25, 2018. Alexandria, LA.

Butler, K. Louisiana Hatcheries Update. Joint Arkansas/Louisiana Fisheries Agency Meeting, July 12-13, 2017. Claiborne State Park, LA.

ADVISORY GROUP MEMBERSHIP

- Southern Division of the American Fisheries Society Aquaculture Technical Committee

TABLE 9. FISH STOCKING BY WATERBODY (7/1/2017 - 6/30/2018)

BODY OF WATER	SPECIES	SIZE	NUMBER RELEASED
Abbeville Community Fishing Pond	Bluegill	Fingerlings	4,557
	Redear Sunfish	Fingerlings	4,603
	Triploid Grass Carp	Adults	50
BREC - Central Community Park	Northern Largemouth Bass	Fingerlings	165
Bayou Huffpower	Channel Catfish	1-Year-Old	109
		Fingerlings	100
Bayou dArbonne Lake	Florida Largemouth Bass	Fingerlings	300,003
Bayou des Glaises	Channel Catfish	1-Year-Old	274
		Fingerlings	225
Black Lake and Clear Lake	Florida Largemouth Bass	Fingerlings	120,488
BREC Pond - Burbank	Channel Catfish	1-Year-Old	221
		Fingerlings	180
	Triploid Grass Carp	Adults	40
BREC Pond - Doyles	Northern Largemouth Bass	Fingerlings	151
BREC Pond - Forest Park	Channel Catfish	1-Year-Old	83
		Fingerlings	165
BREC Pond - Greenwood Park	Northern Largemouth Bass	Fingerlings	935
BREC Pond - Oak Villa	Channel Catfish	1-Year-Old	139
		Fingerlings	110
BREC Pond - Palomino	Northern Largemouth Bass	Fingerlings	123

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
BREC Pond - Perkins	Channel Catfish	1-Year-Old	83
		Fingerlings	156
BREC Pond - Zachary	Channel Catfish	1-Year-Old	139
		Fingerlings	110
Bussey Brake	Bluegill	Fingerlings	222,336
	Florida Largemouth Bass	Adults	500
	Northern Largemouth Bass	Fingerlings	45,546
	Redear Sunfish	Fingerlings	222,865
Caddo Lake and James Bayou	Florida Largemouth Bass	Fingerlings	139,176
Cameron Prairie	Bluegill	Fingerlings	15,250
	Florida Largemouth Bass	Adv. Fry on Feed	106,200
	Golden Shiner	Fingerlings	4,426
	Redear Sunfish	Fingerlings	160,028
	Threadfin Shad	Adults	4,279
Caney Lake, Lower	Florida Largemouth Bass	Fingerlings	2,023
Caney Lake, Upper	Florida Largemouth Bass	Fingerlings	2,023
Chicot Lake	Channel Catfish	Fingerlings	16,423
	Florida Largemouth Bass	Fingerlings	32,992
	Triploid Grass Carp	Adults	1,000
City Park Lake (Baton Rouge)	Channel Catfish	Fingerlings	1,000
Corney Lake	Florida Largemouth Bass	Fingerlings	13,888
Cross Lake	Florida Largemouth Bass	Fingerlings	3,534

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Drainage Canals, Jefferson and Orleans Parishes	Bluegill	Fingerlings	9,464
Dubuisson Lake	Channel Catfish	Fingerlings	2,009
False River	Atlantic Striped Bass	Fingerlings	12,075
	Black Crappie	Fingerlings	3,224
	Hybrid Striped Bass	Fingerlings	5,025
	Northern Largemouth Bass	Fingerlings	8,916
Fields Lake	Florida Largemouth Bass	Adv. Fry on Feed	181,800
Grand Bayou Reservoir	Florida Largemouth Bass	Adults	270
		Fingerlings	31,175
Henderson Lake	Florida Largemouth Bass	Adv. Fry on Feed	337,200
Holbrook Park Pond	Channel Catfish	1-Year-Old	221
		Fingerlings	180
Iatt Lake	Florida Largemouth Bass	Adv. Fry on Feed	1,267,200
Ivan Lake	Florida Largemouth Bass	Fingerlings	6,030
	Triploid Grass Carp	Adults	200
Jackson VA Home	Channel Catfish	1-Year-Old	53
Joe W. Brown Memorial Park	Bluegill	Fingerlings	4,732
Kepler Creek Lake	Florida Largemouth Bass	Fingerlings	22,112
Kincaid Lake	Channel Catfish	Fingerlings	20,001
	Florida Largemouth Bass	Fingerlings	37,981
Kisatchie National Forest	Florida Largemouth Bass	Fingerlings	348
Lake Arthur and Mermentau River	Paddlefish	SAC Fry	153,847
Lake Bruin	Florida Largemouth Bass	Fingerlings	7,251
	Hybrid Striped Bass	Fingerlings	5,085
Lake Buhlow	Channel Catfish	Fingerlings	2,650
Lake Cataouatche	Florida Largemouth Bass	Adv. Fry on Feed	1,389,000
Lake Claiborne	F1 Hybrid Largemouth Bass (Fla. x North. LMB)	Fingerlings	80,000
	Hybrid Striped Bass	Fingerlings	18,683
Lake Concordia	Florida Largemouth Bass	Fingerlings	19,989
	Hybrid Striped Bass	Fingerlings	4,226
Lake St. John	Florida Largemouth Bass	Fingerlings	32,119
	Hybrid Striped Bass	Fingerlings	4,785
Lamar Dixon 11 acre Pond	Black Crappie	Fingerlings	282
	Channel Catfish	1-Year-Old	274
		Fingerlings	225
Little Piney Park Pond	Florida Largemouth Bass	Fingerlings	40
Livingston Parish Pond	Channel Catfish	1-Year-Old	53
		Fingerlings	50
Lower Sunk Lake	Triploid Grass Carp	Adults	4,000
Martin Lake	Channel Catfish	Fingerlings	4,002
	Triploid Grass Carp	Adults	1,600
Oil and Gas Park	Channel Catfish	1-Year-Old	274
		Fingerlings	225
	Florida Largemouth Bass	Adv. Fry on Feed	151,800
Nantachie Lake	Triploid Grass Carp	Adults	3,000
Pierson Lake	Channel Catfish	1-Year-Old	330
		Fingerlings	270
Poverty Point Reservoir	Florida Largemouth Bass	Fingerlings	20,206
	Hybrid Striped Bass	Fingerlings	4,226
Purple Heart Memorial Park	Florida Largemouth Bass	Adv. Fry on Feed	45,000
		Fingerlings	50
Red River (Dam 2 to Dam 1)	Florida Largemouth Bass	Phase II Fingerlings	8,000
Red River (Dam 3 to Dam 2)	Florida Largemouth Bass	Phase II Fingerlings	8,000
Red River (Dam 4 to Dam 3)	Florida Largemouth Bass	Phase II Fingerlings	8,000
Red River (Dam 5 to Dam 4)	Florida Largemouth Bass	Phase II Fingerlings	8,000
Red River (Shreveport To Dam 5)	Florida Largemouth Bass	Phase II Fingerlings	8,000
Rockefeller Refuge	Florida Largemouth Bass	Fingerlings	43,062
Saline Lake	Florida Largemouth Bass	Adv. Fry on Feed	340,200
Sidney Hutchinson Pond	Channel Catfish	1-Year-Old	83
		Fingerlings	65
	Northern Largemouth Bass	Fingerlings	178
Spanish Lake	Channel Catfish	Fingerlings	22,520
	White Crappie	Adults	84
Spring Bayou	Florida Largemouth Bass	Fingerlings	53,902
State Police Youth Camp	Channel Catfish	1-Year-Old	109
		Fingerlings	100
Tensas NWR	Florida Largemouth Bass	Fingerlings	1,370
Toledo Bend Reservoir	F1 Hybrid Largemouth Bass (Fla. x North. LMB)	Fingerlings	50,000
	Florida Largemouth Bass	Fingerlings	803,412
Torres Park Pond	Bluegill	Fingerlings	3,544
Turkey Creek	Florida Largemouth Bass	Fingerlings	60,015
Twin Lakes Pond	Bluegill	Fingerlings	2,242
	Channel Catfish	1-Year-Old	83
		Fingerlings	75
	Redear Sunfish	Fingerlings	250
University Lake	Channel Catfish	Fingerlings	4,000
	Northern Largemouth Bass	Fingerlings	2,394
Valentine Lake	Florida Largemouth Bass	Fingerlings	522
Waddill Ponds	Channel Catfish	1-Year-Old	274
West Feliciana Parish Sports Park	Bluegill	Fingerlings	1,183
Zemurray Park Pond (Hammond)	Bluegill	Fingerlings	5,115
TOTAL			***8,522,935***

For Non-Florida Largemouth Bass: Fry<0.25", Fingerlings = 1-<12"; 1Yr-Old – 1 year old in age (length varies); Adult – sexually mature (length varies)
For Florida Largemouth Bass: Fry <0.25"; Fingerlings = 2-3"; Phase 2 Fingerlings = 3"+; 1 Yr Old – 1 year old in age (length varies); Adult – sexually mature (length varies)

FISHERIES OUTREACH AND EDUCATION PROJECTS

OUTREACH

The Aquatic Outreach and Education Program is designed to inform the public about programs and projects currently underway in the Office of Fisheries. Through outreach efforts including boat shows, school programs, community events and outdoor-related festivals, staff reached over 24,000 Louisiana citizens in FY 2017-2018.

The Fisheries Extension staff conducted fishing workshops and family events which focused on Sport Fish Restoration projects and providing hands-on fishing experience.

LDWF staff also worked effortlessly to recruit more women in the sport of fishing. LDWF staff hope to offer knowledge and experience to help the women gain confidence in order to continue fishing as well encourage others to participate. A partnership between LDWF, the Coastal Conservation Association of Louisiana, Cabela's afforded women two opportunities to attend a one-day Women's Fishing Workshop to learn the fundamentals of fishing. Upon completion of each one-day workshop, participants were entered into a lottery drawing for an opportunity to attend a Women's Fishing Weekend in Grand Isle.

Through Fisheries Extension's merge with Wildlife's Education division and the creation of the Aquatic Volunteer Instructor Program, another 53 volunteers have been trained to help teach others about Louisiana's great fisheries. These volunteers were trained all across the state of Louisiana and have assisted at multiple events where LDWF otherwise would not have had representation. The Aquatic Volunteer Instructor Program provided activity guides, lesson plans and LDWF resources for volunteers to utilize. In addition, loaner kits with equipment necessary to offer the activities and lessons were available to all certified volunteers.

LDWF organized four "Get Out and Fish!" events this year at community parks that are new to our Community Fishing Program. Each of the parks (Purple Heart Memorial Park In Ragley and Grambling City Park in Grambling in the spring; Southside Regional Park - Fabacher Field in Youngsville and Elmore D. Mayfield Park in Ruston in the fall) hosted a "Get Out and Fish!" event with the initial stocking of adult size fish in their community pond. The events were led by LDWF staff and volunteers. Each event offered a fishing competition as well as "how to" demonstrations for everything necessary to fish successfully at that location. Over 1,100 anglers registered for the "Get Out and Fish!" events in FY 2017-2018.

Our fisheries biologists also worked collaboratively with communications personnel to create promotional and educational material detailing research and fieldwork on a variety of topics relating to the conservation and management of fish, hatchery production, non-indigenous aquatic nuisance species and other aquatic resources.

During FY 2017-2018, staff utilized several educational resources including a casting inflatable, mobile touch tank and LDWF's mascot "Robbie the Redfish."

AQUATIC EDUCATION

LDWF's Education Program introduces people to the sport of fishing and promotes awareness of Louisiana's aquatic resources. This is accomplished through fishing clinics, camps, teacher workshops and distribution of publications. Education Program staff and volunteers deliver aquatic education programs.

FISHING CLINICS

Five aquatic education clinics were held across the state, with 1,560 total participants. Subjects covered at these clinics and workshops include invasive species, boating safety, fish identification, tackle selection, casting, and fishing techniques. Participants also had an opportunity to go fishing.

PUBLICATIONS

Three publications were distributed to teachers in Louisiana schools for classroom use. These publications promote appreciation of aquatic resources and habitats.

- "Fishing For Fun" - 6,905 distributed
- "Let's Go Fishing" - 6,788 distributed
- "Finnie the Fingerling" - 4,733 distributed

TEACHER WORKSHOPS

Teacher workshops were conducted to provide training in aquatic education that can be brought back to the classroom. The following workshops were conducted:

Native Fish in the Classroom

Native Fish in the Classroom is a multidisciplinary, classroom-based aquaculture stewardship project for middle to high school students. The goal of the Native Fish in the Classroom project is to develop a positive attitude of natural resource stewardship and to create a constructive, active learning situation in which students can explore strategies for sustaining aquatic ecosystems. Students obtain hands-on, science-based knowledge of the state's aquatic resources. Teachers attended several workshops and meetings to ensure successful preparation for receiving paddlefish eggs. In the spring semester, students attend the paddlefish spawn and are engaged in a meaningful field trip experience by actively assisting biologists with the egg fertilization process as well as learning about fisheries management through several other educational stations during the day. Students rear the paddlefish from eggs to fingerlings then release them to a LDWF pre-selected, pre-approved riverine habitat. During the 2017-2018 school year, 16 schools and approximately 2,000 students participated in the program.

Wetland Education Teacher Workshop (WETSHOP)

WETSHOP is a week-long coastal awareness, wetlands institute for teachers. WETSHOP provides an in-depth look at wetland ecology, fisheries management and coastal land loss in Louisiana. In July 2017, 20 enthusiastic teachers representing 13 parishes participated in field activities and were given information on wetland habitats, botany, wetland ecosystems, Louisiana history, coastal land loss and restoration, water quality, oil and gas exploration, fishing, seining, trawling and fisheries management. Teachers are encouraged to return to their parish and conduct a wetland project with colleague teachers and/or students and/or community.

COMMERCIAL SEAFOOD PROGRAMS

One of the main objectives of the Office of Fisheries is to maintain the viability of Louisiana's fishing industries through programs that protect native resources and provide technical assistance to the industry, including recovery from natural and man-made disasters.

In addition, the Office of Fisheries is pursuing several initiatives for Louisiana's commercial fishing industry including a seafood certification program and a professionalization program that aims to create a more informed and efficient industry. Programs to collect and recycle used oyster shell and concrete to create artificial oyster and fishing reefs are also being developed in coordination with the Coalition to Restore Coastal Louisiana.

SEAFOOD CERTIFICATION

In 2009, LDWF reprogrammed grant money from a NOAA grant to fund certification programs for Louisiana's seafood industry. The overarching plan for a broad certification program included five key components: seafood origin/quality certification; seafood sustainability certification; industry professionalization; electronic traceability; and seafood marketing.

The goal of the Louisiana Wild Seafood Certification Program is to increase demand for wild-caught Louisiana seafood. By creating an origin based brand, LDWF, in cooperation with the Louisiana Department of Health and the Louisiana Department of Agriculture and Forestry, has the ability to communicate to the consumers that the seafood they are consuming is caught by a licensed Louisiana fisherman, landed in Louisiana and processed by a Louisiana processor through the entire supply chain. The ability to create a national brand that can be sought out by chefs, consumers, distributors and retail chains will increase the demand and thereby prices for the Louisiana seafood fishery.

Several changes and developments to the program were implemented during FY 2013-2014 including the transition to an online application process as well as supply chain verification through invoice validation. Also introduced was a product registration requirement - retail packages possessing the program's logo must register with LDWF. In FY 2014-2015, the online renewal process was simplified, allowing participants to easily renew their permit instead of reapplying. Before applying, applicants must also participate in a 45-minute training video available through the program's website. Once permitted, participants are given access to a participant portal where they may access program logo files and verify participation of their supply chain in the Louisiana Wild Seafood Certification Program.

The program's first three years focused on building program interest among seafood dealers and processors within Louisiana. During FY 2014-2015, implementation was focused on the retailer and consumer aspects of the program, with an emphasis on creating demand for products bearing the Louisiana Wild Seafood Certification Program logo. The program has launched additional marketing campaigns including the use of social media. Within FYs 2015-2017 the focus has been to build the interest of the program amongst the public to demand Louisiana seafood

As of FY 2017-2018 there were a total of 71 permitted seafood businesses participating in the program and several "certified" labeled seafood retail packages are being sold in grocery markets across the state.

SUSTAINABLE FISHERIES AND SEAFOOD

The goal of the sustainability program is to manage Louisiana fisheries in a way that provides for today's needs without damaging the ability of the species to reproduce. Many seafood purveyors worldwide are under pressure to demonstrate the seafood they are sourcing is from sustainable and responsibly managed fisheries. LDWF is meeting these challenges with multiple approaches.

LDWF has explored mainstream sustainability certifications for major fisheries, such as those offered by the Marine Stewardship Council. In March 2012, Louisiana's blue crab fishery became the first blue crab fishery in the world to receive Marine Stewardship Council sustainability certification. This certification was scheduled to expire in March 2017, but it was extended to March 2018 as LDWF participated in a new pilot re-certification process. Re-certification to the Marine Stewardship Council standard is expected to be awarded in August 2018.

In addition to Marine Stewardship Council certification, the Office of Fisheries has developed a Gulf-centric sustainability certification system in partnership with the Audubon Nature Institute. The Audubon Gulf United for Lasting Fisheries (GULF) Program is leading the development of this Responsible Fisheries Management certification program based on the United Nations Food and Agriculture Organization and International Standards Organization protocols. LDWF participates on the Audubon GULF Technical Advisory Committees, including a Fisheries Technical Advisory Committee, which previously functioned as the more general Technical Advisory Committee; and a new Chain-of-Custody Technical Advisory Committee that was established in May 2017. LDWF also provides advice through Working Groups on issues such as bycatch assessments and data deficient fishery assessment tools. The Fisheries Technical Advisory Committee, the Chain-of-Custody Technical Advisory Committee, and the Data Deficient Fishery Assessment Tool Working Group met several times throughout 2018. Other discussions were held via conference call and internet-based technologies throughout the year on an ad-hoc basis.

The Louisiana blue crab fishery attained certification to the Responsible Fisheries Management Program in 2016. The fishery passed the first year audit in 2017 and is scheduled to be audited again in December 2018. The Audubon GULF - Responsible Fisheries Management (RFM) Program itself was assessed by the Global Sustainable Seafood Initiative against Food and Agriculture Organization of the United Nations best international practices regarding certification systems. Recognition of the Audubon GULF RFM certification program is expected to be awarded by GSSI in September 2018.

We are continually vetting our program with seafood buyers to ensure Louisiana seafood and the Audubon GULF Program will have market acceptance. LDWF has engaged national retail organizations and suppliers in intense dialogue concerning sustainable seafood market needs and desires. LDWF

continues active conversations with private-sector actors about "fishery improvement projects" and "marine advancement projects" for those Louisiana fisheries that have not taken up formal certification. In January 2016, revised pre-assessments were conducted for the Louisiana shrimp fishery according to the Audubon GULF RFM and the Marine Stewardship Council programs. Based on these pre-assessments, the Audubon Nature Institute is leading a joint fishery improvement project encompassing issues identified in both pre-assessments. A shrimp by-catch study in support of these fishery improvement projects is planned for 2019.

FINFO

Developed in cooperation with GSMFC and the other Gulf states, FINFO is a web-based portal that provides seafood buyers with easy to understand, science-based information about the responsible management of Gulf fisheries and the sustainability of Gulf seafood.

COMMERCIAL SEAFOOD INDUSTRY PROFESSIONALIZATION

The primary goal of Louisiana Fisheries Forward, the voluntary industry professionalization program, is to create a better-informed and more efficient commercial fishing industry that helps ensure the economic sustainability of the state's commercial fishing industry. The program provides ongoing education opportunities for fishermen and industry participants to receive the most relevant and up-to-date information pertaining their industry.

Louisiana Fisheries Forward - Advancing Our Seafood Industry is an LDWF Office of Fisheries collaborative effort with Louisiana Sea Grant and LSU AgCenter. Louisiana Fisheries Forward is a multi-year, multi-phase professionalism program for all sectors of the state's commercial fishing industry, including fishermen, dock owners, processors and distributors. This program is providing the education and training essential for the continued success of the industry and is focusing on a number of important topics through videos with corresponding fact sheets, the Louisiana Fisheries Forward Summit, hands-on workshops and the Louisiana Fisheries Forward website.

From July 2017 to June 2018, LDWF and Louisiana Sea Grant continued to execute Phase III of Louisiana Fisheries Forward; mainly, the production of educational materials (referred to as fast fact sheets), the offering of in-person training sessions (referred to as dock days), a refrigeration demonstration project, the Louisiana Fisheries Forward website (*lafisheriesforward.org*) and reviewing our biannual fisheries summit. Within the time frame stated above the Commercial Crab Trap Gear Requirements and the Oyster Harvester Training Requirements remain active (*www.wlf.la.gov/mandatory-oyster-harvester-training*) and (*www.wlf.la.gov/crabtraining/onlinetraining*).

Examples of Fast Fact Sheet (available on *lafisheriesforward.org*):

- Freshwater Fish Handling
- Barotrauma
- Oyster Regulations Recap
- Seafood Product Labeling

Legislation was passed during the 2014 regular session that required the Louisiana Wildlife and Fisheries Commission to establish a program to increase and elevate professionalism in the commercial crab industry. Throughout the fall of 2014, LDWF developed the Louisiana Fisheries Forward Commercial Crab Gear Requirement. The Commercial Crab Gear Requirement consists of basic training and field training requirements that focus on education such as proper fishing techniques necessary for the health and sustainability of crabs, proper techniques for the best capture and presentation of the crabs for marketability and proper placement, tending and maintenance of crab traps to reduce potential conflicts with other user groups. Beginning Nov. 15, 2014, any person who wishes to obtain a commercial crab trap gear license must first complete this program unless the following exception applies (possessed a valid crab trap gear license any two of the license years, 2011, 2012, 2013 or 2014). By June 2018, there were approximately 78 active participants and approximately 370 participants who completed the requirement. Commercial Crab Gear Requirement details are available at *www.wlf.la.gov/crabtraining*.

LDWF's intention is to give our seafood industry access and training to the latest trends, requirements and technology in their profession. The seafood industry should have as much opportunity for training as any other industry in our state - we believe it will yield higher quality products and give our seafood community a competitive advantage in the marketplace. Since the launch of Louisiana Fisheries Forward - Advancing Our Seafood Industry, this one-of-a-kind professionalism program for Louisiana's commercial fishing industry has received inquiry, acknowledgement and recognition throughout many facets of local, regional, national and world fishing industries.

TASK FORCES

The Office of Fisheries has four active task forces: Shrimp, Oyster, Crab and Finfish. The task forces memberships are currently housed under LDWF, and cooperation between the task forces and the Office of Fisheries is essential as we move forward with the continued management of Louisiana's natural resources.

SHRIMP TASK FORCE

During FY 2017-2018, the Shrimp Task Force met on Aug. 2, 2017, Oct. 18, 2017, Dec. 6, 2017, and April 25, 2018.

Agenda items discussed include:

- Gulf-wide seafood certification and the Louisiana Wild Seafood Certification
- Recommendations for fall 2017 and spring 2018 shrimp seasons
- Shrimping with diversions
- Shrimp Gear Permit Program regulations and introducing new gear
- Shrimp enforcement and penalties; tow times
- Shrimp management and increasing domestic shrimp value

***TABLE 10.** Louisiana Fisheries Forward Commercial Crab Gear Requirement.*

PROGRAM STATUS	APPRENTICESHIP	SPONSORSHIP	GRAND TOTAL
Applicant Ineligible	31	101	**132**
Approved	21	53	**74**
Conditionally Approved	27	63	**90**
M S Ineligible	0	1	**1**
In Review	3	8	**11**
Opt Out	93	277	**370**
Program Completed	175	503	**678**
Grand Total	**145**	**415**	**560**

- Restaurant and retailer seafood advertisement and labeling
- Recommendations for spring 2016 shrimp season
- Passed a resolution to support the State's continued efforts to reduce the Gulf hypoxic zone
- Sponsored the 2018 Louisiana Fisheries Forward Summit
- Participated in the 2018 Louisiana Fisheries Forward Summit Diversion Panel Discussion
- Coordinated Shrimp Task Force trip to Washington, D.C. to host Hill meetings and participate in the 2019 Louisiana Alive event

CRAB TASK FORCE

The Crab Task Force continued to work with the Office of Fisheries in FY 2017-2018 toward improving the Louisiana crab fishery. The task force met on July 11, 2017, Oct. 10, 2017, Jan. 9, 2018, and May 8, 2018.

Agenda items discussed include:

- Louisiana Fisheries Forward Program and crab gear license requirements
- Crab marketing opportunities
- 2017-2018 Blue Crab Harvest Restrictions
- 2017-2018 Derelict Crab Trap Clean-ups
- Sponsored the 2018 Louisiana Fisheries Forward Summit
- Participated in the 2018 Louisiana Fisheries Forward Summit Diversion Panel Discussion
- Blue crab by-catch regulations and possession limits
- Blue crab stock assessment update
- Update on Blue Crab Mark-Recapture Study
- Discussed changing restrictions on crabbing before sunrise
- Discussed banning the harvest of immature female blue crabs
- Passed a resolution to support the State's continued efforts to reduce the Gulf hypoxic zone

OYSTER TASK FORCE

In FY 2017-2018, the Oyster Task Force met on Aug. 1, 2017, Sept. 5, 2017, Oct. 3, 2017, Dec. 12, 2017, Feb. 15, 2018, March 20, 2018, April 24, 2018, and May 29, 2018.

Agenda items discussed include:

- 2017 Oyster Stock Assessment and season recommendations
- 2017-2018- Oyster Season
- State cultch plants on the east side of the Mississippi River
- Adopted a resolution to support the state's continued efforts to reduce the Gulf hypoxic zone
- Discussed the use of hydro-coast maps for more successful fishing
- Sponsored the 2018 Louisiana Alive event and hosted Hill meets
- Tagging regulations for mini-sacks
- Update on oyster import data
- Update on the 2016 summer oyster die-off
- Update on the assessment of oyster loss on public reefs east of the Mississippi River
- Sponsored the 2018 Louisiana Fisheries Forward Summit
- Discussed crevasse control and overflow east of the Mississippi River
- Discussed the Habitat Suitability Index
- Discussed the Common Temperature Matrix
- Discussed the Closure of Mardi Gras Pass
- 2017 Day in the Bay
- Sponsored the Oyster Task Force hospitality suite for the 2017 Interstate Sanitation Shellfish Conference
- Discussed opening Sabine Lake for commercial oyster harvest
- Discussed the Oyster Lease Acquisition Program
- Funded the 2018 Summer Dermo Study
- Update on the Oyster Shell Recycling Program
- Participated in the 2018 Louisiana Fisheries Forward Summit Diversion Panel discussion
- Oyster industry marketing plan
- Discussed utilizing the use of drone operation with GPS coordinates to assist in oyster enforcement
- Considered a proposal to change the timing of the dermo (*Perkinsus Marius*) sample collections
- Discussed the Bonne Carre Spillway opening and a special oyster transplant
- Discussed planning for management of state oyster leasing and public seed grounds affected by coastal projects
- Proposal to increase oyster violations for theft and fishing in closed areas

The Oyster Task Force also continued their marketing efforts including the Task Force's annual trip to Washington, D.C., where they sponsor the "Louisiana Alive" - D.C. Mardi Gras event, which draws members of the congressional delegation, staff and media, and provides an excellent platform to educate others on the importance of the Louisiana oyster industry.

FINFISH TASK FORCE

During FY 2017-2018, the Finfish Task Force met on Dec. 5, 2017 and May 17, 2018.

Agenda items discussed included:

- Established and adopted bylaws
- Update on the status of black drum and discussion on potential changes to recreational and commercial harvest, size and bag limits
- Freshwater stock assessment
- Discussed mullet fishery issues
- Discussed finfish trawling

SOCIOECONOMIC RESEARCH AND DEVELOPMENT

The Socioeconomic Research and Development Section was established in 1992 and currently resides in LDWF Office of Fisheries. The duties and responsibilities of the section are:

- To recommend, conduct and coordinate economic research studies pertaining to wildlife and fisheries resources of Louisiana and the Gulf region.
- To present research findings at appropriate professional and scientific meetings, and publish results in departmental publications and peer-reviewed scientific journals.
- To provide information and support to other sections and divisions within LDWF, as well as agencies outside LDWF, assisting them in accomplishing research needs, management tasks and short- and long-term objectives.
- To represent LDWF and Louisiana on various study groups, task forces and committees established to study, manage and improve wildlife and fisheries resources at the local, state, regional and national levels.
- To administer and implement special programs.
- To perform other activities as directed by LDWF's appointing authorities.

With assistance from the various program managers within the offices of LDWF, the Socioeconomic Research and Development Section prepares Fiscal and Economic Impact Statements that accompany the Notices of Intent for rules and regulations considered for adoption by the Louisiana Wildlife and Fisheries Commission. During FY 2017-2018, 12 Fiscal and Economic Impact Statements were developed and published along with the Notices of Intent in the Louisiana Register.

SURVEYS

SURVEY OF NATIONAL HUNTING AND FISHING DAY PARTICIPANTS

On Sept. 23, 2017, LDWF held a public event in observation of National Hunting and Fishing Day at Waddill Wildlife Refuge in Baton Rouge. Personnel from the Socioeconomic Research and Development Section collected exit surveys of 232 participants in this event. Results of this survey were completed and sent to the LDWF Public Information Section in September 2017.

SURVEY OF LOUISIANA ANGLERS AND DUCK HUNTERS IN NORTHWEST LOUISIANA

Socioeconomic Research and Development staff conducted an on-line survey of 4,519 license holders with freshwater fishing and waterfowl hunting privileges in a portion of northwest Louisiana around Lake Bistineau in December 2017. The survey gathered information about the outdoor recreational activities from all subjects and solicited the opinions of aquatic weed control efforts in Lake Bistineau among those respondents who said they used that water body. The survey received 1,155 responses for a response rate of 27.6 percent of the sample adjusted for non-deliverable surveys.

SURVEY OF LOUISIANA RESIDENTS WITH SALTWATER FISHING PRIVILEGES

Socioeconomic Research and Development staff conducted an on-line survey of 3,208 license holders with saltwater fishing privileges in January 2018. The survey solicited anglers' opinions of a proposed change in the recreational creel limit for spotted seatrout. The survey received 782 responses for a response rate of 25.4 percent of the sample adjusted for non-deliverable surveys.

PUBLICATIONS, REPORTS AND PRESENTATIONS

Isaacs, Jack C. "An Assessment of the Changes in Principal Commercial Fisheries in a Portion of Southeastern Louisiana Waters Following the Collapse of the Bohemia Salinity Control Structure" July 2017.

Isaacs, Jack C. "Summary of the Results of a Survey of Participants in the 2017 Louisiana Department of Wildlife and Fisheries National Hunting and Fishing Day Event" September 29, 2017.

Isaacs, Jack C. "Imports of Shrimp Products." Presentation Given to the Louisiana Shrimp Task Force, September 2017.

Isaacs, Jack C. "Imports of Oyster Products." Presentation Given to the Louisiana Oyster Task Force, September 2017.

Isaacs, Jack C. "Results of an Online Survey of Louisiana Residents with Recreational Fishing and Duck Hunting Privileges in Northwest Louisiana" March 2018.

Isaacs, Jack C. "Status and Trends of Imports of Seafood Products." Presentation Given to the Louisiana Sea Grant Marine Extension Project Quarterly Meeting, December 14, 2017.

Isaacs, Jack C. "Imports of Swimming Crab Products." Presentation Given to the Louisiana Crab Task Force, March 13, 2018.

Isaacs, Jack C. "Results of an Online Survey of Louisiana Residents with Recreational Saltwater Fishing Privileges." April 2018.

Tabarestani, Maryam, Walter R. Keithly, Jr., and Hassan Marzoughi-Ardakani, "An Analysis of the US Shrimp Market: A Mixed Demand Approach." Marine Resource Economics, Volume 32, Number 4, October 2017.

REPRESENTATION ON TASK FORCES, STUDY GROUPS AND COMMITTEES

During FY 2017-2018, Socioeconomic Research and Development staff members represented LDWF on the following task forces, study groups and committees:

- Louisiana Blue Crab Task Force
- Louisiana Finfish Task Force
- Louisiana Shrimp Task Force
- Socioeconomic Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council

ONGOING 2010 *DEEPWATER HORIZON* OIL SPILL ACTIVITIES

DEEPWATER HORIZON NATURAL RESOURCE DAMAGE ASSESSMENT (NRDA) RESTORATION ACTIVITIES: RECREATIONAL USE

The Consent Decree was finalized on April 4, 2016, which resolved $14.9 billion in claims against the 2010 *Deepwater Horizon* oil spill responsible parties and set the stage for the next phase of restoration activities. Louisiana is set to receive a total of $5 billion for NRDA Restoration funding out of the $8.8 billion total to be distributed Gulf-wide. Of Louisiana's portion, $60 million has been earmarked to provide and enhance recreational opportunities which includes $22 million that had been allocated during early restoration for the Louisiana Marine Fisheries Enhancement, Research and Science Center. However, site issues arose during planning and development that precluded the Louisiana Trustee Implementation Group from moving forward with the project as initially proposed. Therefore, during FY 2016-2017, the Louisiana Trustee Implementation Group began the process to reallocate these funds towards alternative restoration projects within the "Provide and Enhance Recreational Opportunities" Restoration Type.

In FY 2017-2018, two draft Recreational Use Restoration Plans/Environmental Assessments were released for public comment:

1. Draft Recreational Use Restoration Plans/Environmental Assessments #2: Provide and Enhance Recreational Opportunities, which considered reallocating the original $22 million in early restoration funds towards other proposed alternative projects that would restore for lost recreational use in Louisiana, with specific focus on enhancing recreational fishing opportunities (Dec. 20, 2017).
2. Draft RP/EA #4: Nutrient Reduction (Nonpoint Source) and Recreational Use, which described and proposed restoration project alternatives considered by the Louisiana Trustee Implementation Group to improve water quality by reducing nutrients from nonpoint sources and to compensate for recreational use services lost as a result from the 2010 *Deepwater Horizon* oil spill (April 20, 2018).

In addition, a draft Supplemental Recreational Use Restoration Plans/Environmental Assessments for the Elmer's Island Access Project Modification was released on May 11, 2018.

GULF STATES MARINE FISHERIES COMMISSION

GSMFC, a compact among the five Gulf states, is charged with promoting better utilization of the marine fisheries including finfish, shellfish and anadromous species through the development of programs for the promotion and protection of these fisheries while preventing any waste of these resources.

Fisheries biologists and economists participate in a number of GSMFC programs and initiatives including Aquatic Invasive Species, Interjurisdictional Fisheries, Fisheries Information Network, and economics programs, as well as providing their expertise in the development of management recommendations. In addition, Fisheries biologists serve on a number of GSMFC Technical Coordinating Sub-Committees including Data, SEAMAP, Habitat, Artificial Reef, Outreach, and species-specific committees and working groups. Fisheries' biologists were present at meetings and discussions pertaining to the various SEAMAP programs. LDWF biologists participated in the creation of various fishery management plans for Gulf species.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

The Gulf of Mexico Fishery Management Council is responsible for the management of commercial, recreational and for hire fishing activities in the Exclusive Economic Zone (EEZ), Gulf waters from the state territorial sea out to 200 miles offshore. The Council prepares Fishery Management Plans and amendments to these plans. Methods of regulation include quotas, size limits, bag limits, seasons, trip limits and other tools fisheries managers employ to control both recreational and commercial harvests.

The head of each state's fisheries division has a seat on the council along with representatives from the fishing industry. Louisiana's seat is assigned to Assistant Secretary Patrick Banks. His designee for Council issues is Chris Schieble, who is delegated to act on his behalf. In addition to the council seat, Office of Fisheries employees participate in advisory roles on various panels and committees: Outreach, Data Collection; Habitat Protection; and Scientific and Statistical Committees for red drum, mackerel, reef fish, shrimp, and socioeconomics. LDWF biologists are also part of the SEDAR pool, a panel assigned to producing the Council's stock assessments.

A list of the Council's Fisheries Management Plans include: Reef Fish, Coastal Migratory Pelagic, Red Drum, Shrimp, Lobster, Stone Crab, Coral, Aquaculture and Essential Fish Habitat. The council meets five times a year to work on amendments regarding these Fisheries Management Plans. Louisiana is considered a leader in the council's fishery management process with creative and out-of-the-box methodologies.

One such creative idea was the state management of the private recreational red snapper fishery. This concept was furthered during the fiscal year and is close to being finalized at the Council level. Amendment 50, as state management is known at the Council level, will provide Louisiana the ability to manage the private recreational red snapper fishery in both state and federal waters, giving Louisiana anglers more quality access to the fishery and more input into decision-making on management.

Further information can be located at *gulfcouncil.org.*

REPORT ACRONYMS

BOAT - NASBLA Boat Operations and Training Program
CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPRA - Coastal Protection and Restoration Authority
CWD - Chronic Wasting Disease
CWPPRA - Coastal Wetlands Planning, Protection and Restoration Act
DMAP - Deer Management Assistance Program
FP&C - Facility Planning and Control
FY - Fiscal Year
GSMFC - Gulf States Marine Fisheries Commission
GULF - Audubon Gulf United for Lasting Fisheries
GULF RFM - Audubon Gulf United for Lasting Fisheries - Responsible Fisheries Management
LDNR - Louisiana Department of Natural Resources
LDWF - Louisiana Department of Wildlife and Fisheries
LDWF-LED - Louisiana Department of Wildlife and Fisheries Law Enforcement Division
LEEC - Louisiana Environmental Education Commission
LNHP - Louisiana Natural Heritage Program
LSU - Louisiana State University
LSUSVM - LSU School of Veterinary Medicine
NASBLA - National Association of State Boating Law Administrators
NAWCA - North American Wetland Conservation Act
NMFS - National Marine Fisheries Service
NOAA - National Oceanic and Atmospheric Administration
NRDA - Natural Resource Damage Assessment
RWR - Rockefeller Wildlife Refuge
SEAMAP - Southeast Area Monitoring and Assessment Program
SGCN - Species of Greatest Conservation Need
SCS - State Civil Service
USACE - U.S. Army Corps of Engineers
USDA - U.S. Department of Agriculture
USDA-NRCS - USDA Natural Resources Conservation Service
USFS - U.S. Forest Service
USFWS - U.S. Fish and Wildlife Service
USGS - U.S. Geological Service
WLWCA - White Lake Wetlands Conservation Area
WMA - Wildlife Management Area